ANNUAL REPORTS

OF THE

DAIRYMEN AND CREAMERIES' ASSOCIATIONS

OF THE

PROVINCE OF ONTARIO

1895.

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.
DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.
CREAMERIES' ASSOCIATION OF ONTARIO.

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DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

OFFICERS FOR 1896.

President, - - - - - - HENRY WADE, Toronto.

1st Vice-President, - - - JOHN MCTAVISH, Vancamp.

2nd Vice-President, - - - E. J. MADDEN, Newburg.

Directors :

Division No. 1 ..... EDWARD KIDD, North Gower.
Division No. 2 ..... WILLIAM EAGER, Morrisburg.
Division No. 3 ..... JOHN R. DARGAVEL, Elgin.
Division No. 4 ..... JAMES WHITTON, Wellman's Corners.
Division No. 5 ..... T. B. CARLAW, Warkworth.
Division No. 6 ..... HENRY WADE, Toronto.

Secretary, - - - - - - R. G. MURPHY, Elgin.

Treasurer, - - - - - - P. R. DALY, Foxboro'.

Auditors, - - - - - - MORDEN BIRD, Stirling.
F. BRENTON, Belleville.

Instructors, - - - - - - G. G. PUBLOW, Perth.

" - - - - - J. D. MCCANN, Perth.

" - - - - - - A. P. PURVIS, Maxville.

" - - - - - GEORGE BENSLEY, Warkworth.

" - - - - - - W. W. GRANT, Wellman's Corners.

NINETEENTH ANNUAL MEETING

OF THE

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

The Nineteenth Annual Convention of the Dairymen's Association of Eastern Ontario was held in the village of Campbellford, on Wednesday, Thursday and Friday, January 8th, 9th and 10th, 1896. The meetings were held in the Music Hall, and every session was well attended. Taken altogether it was the most largely attended convention yet held under the auspices of the Association. The number of questions asked the various speakers showed the keen interest manifested in the proceedings. The business people of Campbellford were generous in their hospitality, and every endeavor was made by leading citizens to make the gathering a success.

THE PRESIDENT'S ADDRESS.

Mr. E. KIDD, of North Gower, President of the Association, took the chair at 11 o'clock on Wednesday morning, and after calling the meeting to order, delivered the following address :

It gives me great satisfaction to meet you again. I am delighted that the enterprising town of Campbellford was selected for this annual meeting, and I take this opportunity of thanking the citizens of this town for their warm reception, and the kindly way you met our Secretary and committee in assisting to thoroughly announce this meeting, by giving advertising, thus enabling us to issue the nice pamphlet programme which has been sent throughout Eastern Ontario. We feel sure we are going to have a splendid meeting, and I desire all to take part.

I regret very much that we have had lower prices the past season than usual, but we must not be discouraged. Even with lower prices and dry weather, nothing on the farm has paid as well as cheese; and I confidently look forward to better markets next season. We can certainly keep better cows, and carefully prepare for the dry weather that is sure to come each year. It seems to me that corn is the sheet anchor for our dairymen, and it certainly is the best and cheapest food that can be grown. I would urge you all to grow plenty of corn. Another thing that is necessary is to have a silo, and to have the corn saved in the best possible shape, so that none will be wasted, and at the same time have it in the nicest condition for the stock. The aim of this Association has always been to make the finest quality of goods, and I feel well satisfied with the results; but as competition is getting keener each year, we must put forth every effort to take another step in advance the coming season. England imports $26,000,000 worth of cheese, and Canada has been able to secure $16,000,000 worth of this great market. But to hold this large trade we want to be energetic and active, giving dealers exactly the quality of cheese they require, and have it go forward regularly, so they can depend on having a constant supply

of our fancy Canadian cheese for their customers. I feel sure I but echo the sentiments of this Association when I thank the Hon. John Dryden, Minister of Agriculture, for the interest he has taken and valuable assistance rendered to us in every possible way; also Professor Robertson, and others, who have rendered valuable assistance in educating our farmers and dairymen to go more thoroughly into dairying. I am sure we feel more than satisfied with the good work performed by our able staff of instructors. Never in the history of this Association has as much good work been done. I feel particularly well pleased with the grand educational work that is being carried on in our well-equipped dairy schools, and I am delighted that the Ontario Minister of Agriculture has directed that another dairy school should be established at Strathroy and will be ready for cheese and butter makers to get a good, sound education in a short time. We must all work unitedly and for one great object, that of building up and extending this great national industry. I take this opportunity of thanking the officers and members of this Association for their generous and hearty support. (Applause).

COMMITTEES.

The following committees were then appointed:

BUSINESS.—Charles Smith, R. G. Murphy, J. R. Dargavel.

NOMINATIONS.—Henry Wade, James Whitton, John McTavish.

FINANCE.—R. G. Murphy, Henry Wade, R. A. Craig.

LEGISLATION.—Wm. Eager, E. J. Madden, T. B. Carlaw.

DAIRYING THE LEADING FARM INDUSTRY.

Mr. D. DERBYSHIRE, of Brockville, was introduced, and said: I congratulate you, Mr. President, on the excellent address just delivered by you, and on your work throughout the year. We expected you would make a careful, painstaking officer, and our expectations have been fully realised. I congratulate this Association on the good work that has been done this last year. Your Secretary has been energetic, and has done splendid service. He certainly is the right man for the place. Under the direction of this Association you have carried on the work of education in each factory in Eastern Ontario by your able staff of instructors, and I know that finer goods have been turned out than ever before.

We have received lower prices and had dry weather to contend with, but, as you have said, nothing has paid better, and when we consider that in 29 years only one year before went below a paying basis, we certainly should not complain. Even this year can be made profitable, if we will only examine ourselves and our surroundings. Has each individual farmer done his best? Have you kept only profitable cows, and let the ordinary ones go, and raised a few heifers from your best cows to take the place of those discarded? Have you a warm, well ventilated stable, where the sun can shine in, where the cows can be kept comfortable? Have you grown plenty of corn, and built a silo, so that to-day you have plenty of good nutritious food? If not you have not done your duty. No amount of grumbling on your part about low prices, about the mistakes or mismanagement on the part of our governments, will excuse you for neglecting your own business, and not giving the end of the work you can control every possible attention. The thoughtful man will learn by this last year's experience that we must reduce the cost of production as a means of our ultimate victory. We must have a longer season, by co-operative methods, making cheese for six months and butter the other four. This can only be done by the farmers using their influence and sending their milk to large factories, where the buildings will be constructed so that they will do your section credit, and which

will be equipped with the right machinery, and with a competent well-trained man in charge. With these factories centres of education, you will be surprised at the advancement which will be made. We must not only reduce the cost of production, but we must have a finer quality of goods. This can only be accomplished by each individual farmer doing his best to send to his factory a larger quantity and a better quality of milk that has been strained and well aerated, and carefully got to the factory in the best possible condition. We can only hold the first position in this fair land, already famous for making fancy cheese, by all working together and making Eastern Ontario goods, what we all desire them to be, the finest in the world. Do not be led astray by some one who has been a failure in everything he undertook, but stick to dairying with improved methods, because it is the leading industry in our country to-day, and must continue to be so in the future. I am particularly anxious to impress on your minds the great necessity of improved methods, better cows, better stables, larger quantities of nutritious foods, not only reducing the cost of production but making a finer and more uniform quality of goods, thus securing for us a permanent demand at higher prices. I agree with you, Mr. President, that this Association has been a power for good through holding conventions and disseminating useful information, making grants of money prizes, to aid in holding attractive and stimulating exhibitions of cheese, and in every way fostering the dairy industry in this whole eastern section, and I feel sure that if we would all go home from this convention and commence a thorough examination of our stock and premises, and everything pertaining to our business it would fully repay us. Send one of your young men to one of our well equipped dairy schools, urge your cheese-maker to go also, and get inspired with new ideas and a more practical and thorough understanding of our business, and then we will all have the great satisfaction of seeing 1896 the most prosperous of any in the history of this important organization.

I am directed by the Mayor of our Island City to invite you to hold your next annual convention at Brockville, and I feel sure that a warm reception will be given this Association, and a large, enthusiastic and enquiring audience will be in attendance to listen to the eminent instructors in dairying that your Association has always secured.

In closing, I would say that while we may not expect to get the fabulous prices for our cheese we once received, I think we can get better prices than we do. At the present price every box will be picked up by the first of June, and that will mean better prices next year. The main cause of the depression this year was because we got higher prices in the previous autumn. We made some winter cheese that year, and being of a poor quality it brought down the price. It has been truly said that if the cheese made in January, February and March were thrown into the St. Lawrence we would have been better off in pocket. Corn is a sure crop, and this season wherever that crop was grown it was vigorous, and, notwithstanding the drouth, it was a better crop than ever before. Some men are buying straw for feed to-day, and are losing money with their cows, simply because they did not grow corn. Mr. Bissell, a dairyman in our section, has a silo that he does not open in the winter, but uses it in the summer, when the dry weather comes and the flies are abundant. He puts the dairy cows in the cool stable, with screens in the windows to keep the flies out, and feeds them with ensilage and other succulent food, and has an abundance of milk from his happy and comfortable animals. (Applause.) No June grass is better or so cheap. There are some who fear that we may overdo the cheese business. I have one friend who is always talking that way. I said to him, "My dear sir, do not be alarmed. There are not enough persons who will practice what is necessary in order to keep into this narrow road leading to higher things in the dairy line to overcrowd the way. How many will go in for 'final perseverance' in this line of work?" He scratched his head and went out. I fear, however, that he is still pondering on the matter, for he is one of those men who will be buying straw at high prices instead of feeding succulent corn to his cows.

We have been advancing in Eastern Ontario in the cheese and butter industry, but we must continue to improve. Other portions of the Dominion are making progress, and Quebec is coming forward as fast as she can to vie with us for the supremacy. I was at

Cowansville, in the Eastern Townships, some time ago at a dairy gathering, and I told them that as a fellow Canadian I was delighted at their enthusiasm in dairying. "Why," said I, "we never heard of you before as dairymen. At the Centennial, at the Colonial and at the World's Fair it was all Ontario cheese that beat the world. I think we can beat you still, but I am glad you are waking to your opportunities." At the close of my speech one or two excited French-Canadians came forward, and energetically shaking their fists under my nose, exclaimed: "You can't do it any longer." (Laughter and applause) Gentlemen, we must look to our laurels. If we have cows which do not come up to a good standard, weed them out. Breed up to the ideal. What do men do who wish any particular quality in their horses—be it speed or form? They breed toward that particular requirement and select carefully. So must we with our milking cows.

The meeting then adjourned.

FIRST DAY—AFTERNOON SESSION.

There was an unusually large attendance when the President resumed the chair at two o'clock. After a few preliminary remarks he called upon the instructors for their reports.

REPORT OF INSTRUCTOR PURVIS.

I herewith submit my annual report of work done as your instructor during the season of 1895.

I commenced work on May 8th and quit on the 25th of October, working in all 131 days, ninety-nine of which were spent in factories giving instruction and testing milk, thirty in travelling, and two in visiting Brockville Cheese Board on business with the directors of the Association.

I received calls from 124 factories for visits, but owing to the lateness of some of the calls I was able to visit only sixty-nine factories, a number of which I visited three times, making in all ninety-nine visits. I tested 5,290 samples of milk, fifty-seven of which I found had been tampered with. With three exceptions these were dealt with by the managers of the factories, after being notified by me to do so. I laid information with a magistrate against three, who pleaded guilty and were fined. Of the number who were detected supplying deteriorated milk forty-six were at factories not visited by me in former years, only eleven having been found wrong at factories where they secure the services of an inspector every year. This shows the advantage of this part of the work. The cheese-makers I found eager for advice. A great many of them ripen the milk too much, and have to hurry the work afterwards, and do not allow the curd time to get firm before the whey has to be drawn, the result being lack of body in the cheese. I advise ripening so that the whey will come off with a full one-quarter of acid on hot iron at from three to four hours after setting. This gives time to fully cook and firm up the curd in the whey without danger of acid cut, and gives the cheese better keeping qualities. There is a steady improvement in the condition of the factories, but there are chances of a great advance in this line yet, a great many factories being only single boarded and totally unfit to keep cheese in. However, I am looking forward to a decided improvement next year, as last season taught a lesson to some factorymen they will not forget soon.

The following is a list of the factories visited by me during the season for the purpose of instruction and inspection ; also the number of visits made to each :

Factory.	Visits.
Fournier	3
North Williamsburg	1
Dunbar	3
May's Fancy	3
Craig & Son, No. 1	3
do No. 2	2
do No. 3	2
do No. 4	1
do No. 5	1
Dunbar (2)	1
Aberdeen (1)	3
St. Amour	3
Curran	1
Therrien's	2
Siloam	2
Cadieux	1
E. H., No. 1	1
do No. 2	2
do No. 3	2
Spring Creek, No. 3	1
Maple Leaf	3
Russell, No. 6	2
do No. 10	1
Russell, No. 3	1
do No. 14	1
Lodi	2
Ashburn	1
Rose & Co., No. 1	1
do No. 2	3
White Globe, No. 3	1
Elm Street	1
Elma	1
Pendleton, No. 1	2
do No. 2	1
Tourangeau, No. 1	1
do No. 2	2
Kirk Hill, No. 8	1
do No. 7	1
do No. 4	2
do No. 12	1
do No. 5	1
do No. 2	1
do No. 10	1
Demers	1
Mongenais	1
Lorne	2
Spring Creek, No. 1	1
Aberdeen (*a*)	1
Climax (2)	1
Ash Grove	1
Ste. Anne	3
Ottawa Valley	1
Routhier	1
Farmer's Joy	1
Riceville	1
Embrun	1
Metcalfe	1
Sherriff's	1
Mulloy & Co	1
Morrisburg	1
Lunenburg	1
Riverside	1
Mayerville	1
White Star	1
Star, No. 1	1
Goldfield, No. 2	1
St. Isidore	1
Elm Grove	1
Wyman's	1

Making in all ninety-nine visits.

Yours respectfully,

A. P. PURVIS.

Mr. EAGER: Do you make the test with the Babcock?

Mr. PURVIS: Yes; I use the Babcock tester and the Quevenne lactometer.

Mr. EAGER: Were the people satisfied where the tests were made?

Mr. PURVIS: Yes. My method was that when I went to a factory and completed my test I noted on my list those that were wrong, or that I thought were wrong, and where I considered it advisable I went to the farmer's place and took a sample that I saw was drawn from the cows; and if I was not satisfied that the milk sent to the factory was all right I conferred with the manager of the factory or the committee, and then made arrangements with the guilty parties as to settling. Sometimes I had to notify them in writing, giving them until a certain day to settle. With three exceptions they settled. Some arranged with me, as they would prefer settling with a stranger.

Mr. EAGER: During the season of 1895 did you find the factorymen paying by quality, as a rule, or going about in the old way of pooling the milk?

Mr. PURVIS: A number paid upon the fat basis, and from these factories I had but very few cases of milk that had been tampered with; and besides they generally had a skilled hand at the testing. However, I found that the patrons like a disinterested person to do the testing.

Mr. EAGER: Did you find the patrons inclined to favor payment for milk according to the amount of butter-fat?

Mr. PURVIS: Not to my personal knowledge. A few in the county of Glengarry had been paying on the fat basis, but the testing had been made by the cheese-maker, and they this year decided to pool their milk again. They apparently were not satisfied with the cheese-makers' testing.

Mr. EAGER: You think they were not satisfied on account of the testing being done by the cheese-maker?

Mr. PURVIS: Yes; that appeared to be the reason.

Mr. DARGAVEL: Who else could they have to do the testing?

Mr. PURVIS: Mr. Eager has a man who does nothing else but test the milk in his various factories.

Mr. DARGAVEL: That would not be practicable unless a man had a number of factories under his control.

Mr. PURVIS: One man in Winchester does the testing for a number of factories. Regarding the ordinary plan of testing, the usual mode is for the cheese-maker to make a composite test. I think the testing in such cases is done twice a month, but I am not sure of that. I have visited only two factories where they are paying by the Babcock test.

Mr. MURPHY: Do you think it is possible for scattered factories to combine and pay one man to do the testing for all of them?

Mr. PURVIS: Yes; I think it is possible, and I further believe that it is the only practicable plan. I know of one factory paying now on the basis of butter-fat, and there the patrons are taking much better care of their milk than formerly. They are careful to air it, and handle it better in general. I would urge upon dairymen the importance of aerating the milk. If the milk is allowed to become quiet and the cream has formed, under certain conditions that cream will be leathery, and you cannot incorporate it in your milk, and therefore may not get a fair sample for testing. Better care of the milk means better milk both in flavor and also in the tester.

Mr. DERBYSHIRE: If the proper aeration of milk, and getting it to the factory in better condition, is possible, and men do so, why don't they make better cheese and more of it from such milk?

Mr. PURVIS: I think they do.

Mr. DERBYSHIRE: Then don't you think that ought to prevent all those expensive law suits and turmoil and ill-feeling among neighbors?

Mr. PURVIS; They are not apt to act in such a dishonest or unneighborly spirit when they try this plan we recommend.

PRACTICAL EXPERIENCE WITH THE BABCOCK TEST.

Mr. Wm. EAGER, of Morrisburg, a former president of the Association, and proprietor of one of the largest combinations of cheese factories in the Province, was introduced, and spoke as follows: I have had a good deal of experience in cheese-making, but I find it is one thing to make cheese in a factory and another to get up on a platform and deliver an address upon that subject. As one of your directors I have had Mr. Purvis under my charge for the past two years. I am the furthest east of the directors, and our section runs down to the Province of Quebec. On my own account I have been trying my best for the last three years to introduce the Babcock test in all my factories. I have not succeeded in all, but I have done so in most cases. It has been difficult for me to accomplish even as much as I have done, because I have been a sort of advance guard, away in front of the regular army, and have had to cut the way for myself and the others who are following. We have had a great many difficulties to contend with, which have tended to keep us back. In 1893 we started with one factory, paying for milk according to butter-fat. I touched it very lightly at the beginning, because you all know how patrons argue at first against the idea of paying for milk upon the new basis. Mr. McEwan was employed by the Association to travel through this eastern section of the province, and give instruction to the factories about butter and cheese-making. He was a good man. I had him for a few days to help me to start the plan of paying for milk according to the percentage of butter fat contained in it. At the first everything went along very smoothly until we went to make up the pay-list and distribute the money. When one man has milk testing 3 per cent., another milk testing 3.4, and another milk showing 3.8, it makes a difference as compared with the old pooling plan. And when

people have been accustomed to receive payment according to the number of pounds of milk sent in, regardless of quality, getting as much per pound as their neighbors who sent richer milk, it is hard to have to cut them down one or two or three or four cents per hundred pounds of milk. After the first month was settled for the thing quietened down, and we tried it for another month. The milk began to get better, and kept improved, and has been more uniform in condition. I had twenty-five factories using the test and paying according to butter-fat in 1894, but later in the season two of these kicked over the traces, and went back to the old plan. In that year three other factories refused to accept the Babcock test, as they did not consider it a fair plan. They held that there was as much cheese made from milk that stood 3 or 3.5 per cent. as there was in richer milk We find it difficult to get people to believe that there is more cas-in or curd in the richer milk. In 1895 we have had equally good results with the tester. Taking the work on the whole I think we have succeeded very well. In looking around, however, I find there are many factories that seem afraid to have anything to do with the Babcock test as the basis of payment. I have also observed that where the people have been educated up to the point of accepting the Babcock as the basis of payment there is better care taken of the milk. They find that if they do not keep up the quality of the milk they will not get the best figure possible for the same. It means also that in order for a man to get his milk up to this high quality he will look over his cows, and will not keep any animal in his dairy that will not give a good mess of milk with a high percentage of fat. It gets the people out of the old rut, and puts the business on a better basis. According to the old system of paying for milk as it is sent to the factory, the slip-shod fellow who sends milk of a poor quality gets as much per hundred pounds as the man who sends the richest milk, and he says that he does not want to try any other plan. The good patron says: "That other good-for-nothing fellow gets as much for his milk as I do," and he gets discouraged. It is not fair. It is not business-like, and it is not honest. As manufacturers of cheese we have also been doing things in a slip shod way. Now that we have a better thing why should we not adopt it? Is there any doubt as to whether this man is skimming his milk, or that man is saving the strippings, or another man is putting in water? You can soon determine the matter with the little instrument we recommend. Before we put in the Babcock tester some of our patrons used to wonder why it took so much milk to make a pound of cheese. I would ask, "Have you seen anything wasted?" They would answer "No." I would assure them that the milk was put into the vats to make cheese, and that everything was done by us that could be done to get the best out of that milk. Yet those patrons would go away dissatisfied with my answer, and would perhaps think that I did not know much about the making of cheese. If one of these men comes to me now and says, "Why does it take so much milk make a pound of cheese in August?" I would go to the register and tell him it was because Mr. Smith, Mr. Brown, and Mr. Jones had so low record of fat in their milk for that month.

Mr. ASHLEY: Tell us if the factories now make a pound of cheese from less milk?

Mr. EAGER: It does take less milk to make a pound of cheese where the fat test is in use compared with those factories which do not use the Babcock tester. I can confidently assert that it takes less milk to make a pound of cheese in my factories where we use the Babcock test than it does in your factories where the Babcock is not used.

Mr. ASHLEY: We have honest men in our factories.

Mr. EAGER: And so have we. And they are more likely to be honest and remain honest where there is a registering of the richness of the milk by the Babcock.

Mr. BRENTNELL: Can't a maker who uses the Babcock steal also?

M. DERBYSHIRE: The Babcock hinders that. You see the *total* of the product is divided between the patrons. Where can he steal?

Mr. EAGER: I would like to be shown how any man can do the right and honest thing with those who furnish good standard milk except he pays according to the fat contained in it. Why should those who furnish rich milk carry those who send poor

milk below the standard in fat? It is hard, I admit, to get people out of the old rut. But things are improving. We have now three classes of men: The theorists or scientific men, the practical men, and the kickers. The theorists have their place, and science has done much for the cheese industry. We owe the Babcock tester to one of these theorists. But the scientists could do but little for us were it not for the practical men who take hold of the plans, and utilize the plans of the theorists; and it is to the hard-headed, practical men that we must look for advancement in these matters. Our conventions are of benefit only as far as we use them or follow their teachings in a practical manner. There are some farmers who are always complaining; but if you go to their cow stables you will find that the thermometer will go as low there as it could out of doors. They are not learning; certainly they are not applying what little knowledge they possess, and yet they go on. All that Mr. Derbyshire said this morning about corn and cheap fodder is true. But what surprises me is that while we talk corn at our conventions from start to finish, how many farmers build silos? How many farmers build really comfortable stables for their cows? And yet we all know that good stables and cheap feed are the two essentials of successful dairying. Look at our own dwelling houses. Take one that is well and comfortably built, and another that is badly built, and how soon we want to get out of the latter when trying weather comes. Cattle are more responsive to good or bad quarters than we ordinarily think. In conclusion, I would say that an important point in dairying is the weeding out of poor milkers. This needs only to be mentioned to get your approval. Yet how little selection of good milking cows there is on the average farm. We have cause for satisfaction in the fact that no other branch of farming has suffered as little as our own during the past twenty-five years. Therefore I advise you to stick to your cows—that is to the generous milkers—and make them as comfortable as possible. Do not be discouraged over a temporary decline in the price of cheese. There is still plenty of room for fine goods. Let us aim to make the best cheese possible as cheaply as we can.

Mr. STILLMAN: Does not a certain amount of butter-fat go off in the whey, and would not a greater amount go off in the richer milk?

Mr. EAGER: If you will permit milk to remain in the can until the cream comes to the top in a tough and leathery condition, there are portions of that cream that the rennet will not get hold of in the vat, and that will go off in the whey. But where the milk is properly taken care of, and is not allowed to get into that leathery condition, when the rennet goes in nearly all the butter-fat is incorporated in the curd, and so you get the benefit of it.

Mr. STILLMAN: What care would you take of it?

Mr. EAGER: Use the aerator, or else stir it in the can with a dipper, taking the milk at the temperature of the atmosphere, and next morning you will not find the cream tough and hard, but softer, and more likely to be incorporated into the cheese. Of course it will be tougher in the spring.

Mr. MCCARGER: Do you not think the aerator better than stirring? Is not the latter likely to break the butter?

Mr. EAGER: Yes, it is better done by the aerator.

Mr. STILLMAN: Is there any more waste of fat in rich milk?

Mr. EAGER: In November, 1893, I had one of my makers experiment with a vat of milk, which averaged 4.45 per cent. of fat, and was in first-class condition every way. After making the cheese he tested the whey for fat, and found that there was less fat in the vat than when cheese was made in June from milk averaging 3.3 per cent. of fat. So you will see that the idea does not hold good that there is more waste of butter-fat in the case of the richer milk. I feel confident that if we would all try to get the milk to the factories in first-class condition that, with our excellent cheese makers, we would astonish the world. But where you see milk cans coming to the factories in a filthy condition, and everything looking more or less dirty, you cannot expect much.

Mr. STILLMAN: Those cheese ought to taste "strong." (Laughter.)

Mr. McCARGER: How do you account for greasy curd? Have you any down in your part of the country?

Mr. EAGER: Well, you have got me. We have greasy curd sometimes, but we have not been able to account for it.

Mr. MURPHY: Our maker says that it is caused by ripening the milk too much and not using enough rennet.

SEVERAL VOICES: "That's it," and "Hear, hear."

Mr. EAGER: My maker found this condition of affairs more likely to occur when the weather was very dry.

Mr. STILLMAN: Will Saturday night's milk make as much and as good cheese as that of other days?

Mr. EAGER: If Saturday night's milk is well cared for it will make as good or better cheese than that of Monday.

Mr. WHITTON: Are you thoroughly convinced that using the aerator is the proper method of airing milk?

Mr. EAGER: Yes.

Mr. WHITTON: I thoroughly agree with you. With the dipper you can aerate the night's milk, but the morning's milk will get no aeration at all, as that milk is put into the can and sent to the factory with the night's milk. I think it would be a great improvement if the morning's milk was aerated as well as the night's milk. In aerating Saturday's milk get it as cool as the atmosphere or cooler, cover the can with a blanket, and that milk will be as sweet on Monday as that of any other day, and it will make good cheese. Keep it out of the sun however.

Mr. T. J. THOMPSON: Is there more cheese made from a Jersey cow's milk than from any other breed?

Mr. EAGER: Prof. Van Slyke says that when you get above five per cent. butter-fat in the milk it does not pay any better than milk a trifle poorer when made into cheese.

Mr. T. J. THOMPSON: Do you think that adding one or two per cent., as advocated by Prof. Dean last year, is right?

Mr. EAGER: Prof. Dean will be here to-morrow and will answer that.

Mr. W. W. GRANT: In travelling about as cheese inspector and instructor there is plenty of opportunity of finding out the troubles that prevail in the factories. The cheese makers have an abundance of questions to put to us regarding their difficulties. One of the most common mistakes made in cheese making is over ripening the milk before adding the rennet. I consider this a serious error, because if the milk is over ripened the solids are precipitated and broken up so that the rennet cannot properly perform the work of coagulation, and consequently there will be a loss in the whey and in the yield of cheese. In one factory that was making thirty cheese a day, I went and made one cheese more a day from the same amount of milk. Now that maker had been allowing one cheese to run out in the whey each day, which means a considerable item in the profit and loss account. With milk which is over ripened, and with milk generally, if you do not get the curd properly cooked you cannot get the proper body to your cheese. A good deal of our cheese throughout the country is short in the grain, and the body is not as elastic as it should be. I do not think a curd can be properly cured in two hours. Cooking a curd is like baking bread—it needs a slow, thorough fire. Milk is a liquid, but it contains certain solids, some of which are held in suspension and others in solution. It takes time to get the dairyman to understand the properties of the milk he supplies. If the cheese maker will try and get his patrons to take good care of their milk the ordinary troubles can be easily remedied. Very often, however, the fault is with the maker. He is sometimes too careless in receiving inferior milk. If he sent such milk home it would create a change. Regarding greasy curd, I think it is caused mainly by the over-ripening of the milk and harsh treatment. But if milk is gassy on account of being made from

impure milk, it cannot be expected that the cheese will be as good as if made from pure milk. This fermentation or gas in milk prevents the rennet from coagulating, and therefore I think it is necessary to use more rennet with gassy milk. I have seldom found a cheese maker who had any fault to find from using too much rennet. I think, too, that too many thermometers are wrong. I have found about one thermometer out of ten right as I have gone among the factories.

Mr. STILLMAN: What is the cause of grassy milk?

Mr. GRANT: There are a good many causes. Two years ago last summer, early in the season, I had some bad milk, and because the day was cool it was harder to detect the odor of the milk; still I had what cheese-makers call a "regular stinker." I put a teacupful of milk from each patron in a bottle, and I found that the milk of one patron had the same odor. I went to the place the same evening, and found they had been drawing out manure, and that the milk had absorbed the flavor. Another cause of gassy curds is to be found in the condition of the old milk stands. In old sections gassy curds are getting worse, and in new sections there is less of it. If you keep milk in a pure atmosphere, I do not think you will be much troubled with gassy curd.

Mr. ASHLEY: You say that the cause of some cheese being bad is the fact that the cheese has been overripened. Can you tell us when the milk is just ripe enough?

Mr. GRANT: Most of the cheese-makers use a rennet test. By the action of the rennet we can easily tell the state of acidity or ripeness of the milk. I consider the rennet test perfectly reliable. Of course you must have your standard. A drachm of rennet will coagulate eight ounces of milk in about twenty seconds in the spring of the year. Of course the rennet test will not work the same at all seasons of the year. Much will depend, however, whether you set your milk at eighty-six degrees or eighty-four degrees or eighty-two degrees. It should be set so that it will dip in not less than two and a half hours. It would be all the better for three hours. Dirty cans are also a cause of gassy curd. I have seen old cans on which, if you scraped your nails up the side, you would get a lot of ancient yellow matter which had been attached to the can, and that would make gas. (Laughter.)

Mr. POTTER: What time do you think is necessary to heat the curd?

Mr. GRANT: Keep up the heat gradually. Stir the curd ten or fifteen minutes before you put the steam on. It is a mistake to think that you get a good curd by heating up too rapidly. What do you think of cheese being porous on account of not being properly cooked? The moisture being kept inside by hasty or imperfect cooking renders the cheese porous.

Mr. MURPHY: Are not these what are called mechanical holes or pores?

Mr. GRANT: Perhaps so; but it is porous cheese.

A MEMBER: What is the standard time for cooking?

Mr. GRANT: If you set it to dip, in three hours, have it coagulate in half an hour. Stir and dip fifteen minutes. That would mean three-quarters of an hour, or perhaps an hour. Stand an hour rather than half an hour.

Mr. POTTER: At what degree do you set?

Mr. GRANT: I begin at eighty-six degrees, and get up to ninety-eight degrees or one hundred degrees.

Mr. POTTER: What gives us the cracked surface on the sides of cheese?

Mr. GRANT: It may be on account of having greasy curds. The grease will be pressed out and the rind will crack.

Mr. POTTER: Do you think it is because it is put to press too cold?

Mr. GRANT: In the summer time we do not get curd too cold.

Mr. POTTER: I have seen curd that would not press together in the summer.

Mr. WHITTON: Do you think that putting cheese to press too quickly after salting may have caused that? The curds at that stage would be coarse and would not knit together.

Mr. GRANT: Sometimes the bandage is too loose upon the cheese. I would advise putting on a fifteen and one-half inch bandage to a sixteen-inch hoop.

Mr. POTTER: I have heard cheese-makers claim that the curds should be put to press fifteen or sixteen minutes after the salt is applied, but I do not think it could get mellowed down in that time.

Mr. GRANT: You are right. Some of the coarse salt used may be fit to give to cows, but it does not do for cheese. "White whey" is also caused by imperfectly cooked curd.

A MEMBER: I have found difficulty in getting my bandages to fit my hoops.

Mr. KIDD: I use a bandage half an inch smaller than the hoop, and it makes a neat looking box. I use a tin hoop with an upright press. We use a bandage for filling, and it is nearly three-quarters of an inch less than the hoop.

Mr. ANDERSON: At what temperature would you advise us to set a fast-working curd?

Mr. GRANT: I would set it lower. By using a little more rennet and setting at a lower temperature you might get ahead of the acid.

Mr. POTTER: Do you think the water vat an improvement on the steam one?

Mr. GRANT: Perhaps it would be if the vats would hold water.

Mr. DILWORTH: Have you ever found the presence of rainwater in the milkcan to interfere with the flavor of the milk?

Mr. DERBYSHIRE: Honest rainwater that comes right straight down from heaven is all right. (Laughter.)

Mr. GRANT: Prof. Dean says that it does affect milk.

Mr. A. W. FREE: Do you think that allowing milk to freeze would have any effect upon the grain?

Mr. GRANT: No.

Mr. MCCARGAR: Do you find the grease any worse when patrons cool their milk down with ice?

Mr. GRANT: No; because, as a rule, people who cool their milk with ice are usually very good dairymen. Such people are likely to aerate their milk.

Mr. MCCARGAR: Is there any danger at all in using ice where aeration is done?

Mr. GRANT: Yes. It is not wise to cool it too much below the atmosphere. If set in a foul atmosphere the milk will absorb foul odors.

Mr. MCCARGAR: I think all animal and other bad odors should be taken out before the milk is cooled.

Mr. KIDD: If you do not take out the bad odors then, you cannot get them out later.

AGRICULTURAL GRASSES.

Mr. JAMES FLETCHER, of the Central Experimental Farm, Ottawa, delivered an instructive address upon the subject of "Agricultural Grasses," which was listened to with keen interest by those present. He said: There are few experiments now in progress on the Central Experimental Farm which are of more interest to visiting farmers than those which during the last seven years have been carried on regularly with the native and introduced grasses. It is not necessary to point out to a farmer the great importance of the

various members of the grass family which provide so large a proportion of his own food and that of his stock. All the cereals, including Indian corn,—concerning the virtues of which in these days of ensilage worship nothing need be said to dairymen,—wheat, barley, oats, etc., are true grasses, as well also as the gigantic bamboo which in the tropics rises to a height of 100 feet, with a stem at the base nearly as large as a man's body. We in Canada have no less than 300 different kinds of grasses, native or introduced. Some of these, of course, are very much more valuable agriculturally than others; and, besides this, they vary among themselves in value for different purposes, some being useful when grown on one soil, but of little value when placed under circumstances which do not suit them. In these experiments we have had under consideration about two hundred different kinds of grasses. Seeds of our wild native species have been procured whenever possible, as well as all kinds of fodder plants which are advertised as useful in seed catalogues. We have found that several of our native species are well worthy of cultivation for hay and pasture and are as well suited, if not better, for paying crops in some part of Canada than many of the expensive imported varieties. It may not be amiss to state here what are the requirements of good agricultural grasses. First of all, they should be heavy croppers, so as to give enough crop to pay well for the use of the land; secondly, they must be hardy, so as to stand the climate; thirdly, they must be rich in nutritive constituents so as to be worth growing; and lastly, they must be palatable so that they may be eaten readily by stock. A knowledge of which grasses are best for certain lands or for certain conditions of climate, is of great value to those striving to make the greatest success of their farming operations.

There is no doubt that, on the whole, timothy is the most popular grass grown in Canada, and this is justly the case, for there are certain characteristics which make timothy a paying grass under most circumstances; but, notwithstanding this, timothy is not under *all* circumstances the most remunerative grass to grow. Let us examine some of its qualities. First of all it is well known, the hay is easily pressed and handled, it is heavy for its bulk and is nutritious; not only is it easily handled as hay, but this is the case also with the seed; and the seed is easily cleaned and has the further convenience of always being obtainable. Timothy hay is so well known in the market that it always sells well; but for all this timothy is not always the best grass to grow. I will mention one or two of the defects which show that it is not a perfect grass and, therefore, should not be grown to the exclusion of all others in all localities. In the first place, it gives very little aftermath. It does not stand close cropping like many other grasses; horses, sheep and pigs are apt to crop it too close and injure the roots. In the way in which it is generally mixed for a hay crop, that is with common red clover, it is apt to be injured if cut when the clover is at its best, because, although so much grown together with it, common red clover is ready for the mower ten days before the timothy. When cut too soon, the bulbs at the bases of the stems of timothy are injured and there is only a weak growth afterwards, which is frequently winter-killed, and the bulbs are often injured by mice and insects. Now I am not saying that timothy is not a valuable grass, but that it is frequently grown without a sufficient amount of thought being given to the matter of what it is being grown for. Timothy is essentially a hay grass and an extremely valuable one. If it is desired to grow timothy and clover together, the Mammoth Red clover should be used, because that variety comes to maturity at the same time as timothy. For mixing with the Common Red or June clover, Orchard Grass is decidedly a better grass from the fact that it blooms at the same time as the clover and is an enormous cropper. It is a grass which I believe ought to be far more grown than it has been. I am surprised that the dairymen of Canada, who have made such strides in pushing forward their calling, have not paid more attention to this grass. It is of most luxuriant growth and gives a large quantity of nutritious and succulent feed, probably more than any of the cultivated grasses, except Indian corn. I may here point out that, where Indian corn can be grown successfully, that one plant solves the problem of producing the largest amount of good succulent and nutritious feed from an acre of land; but even in districts where corn can be grown satisfactorily, the finer grasses will be found very valuable as a supplement or for variety.

I shall only draw your attention to-day to a few of the best grasses; however, I would mention that careful notes have been taken concerning all the varieties experimented with; and, if any one requires information upon them, he can get it by applying to me at Ottawa. The plan which has been adopted in experimenting with these grasses is ts propagate each variety until we have a sufficient quantity to plant one square rod; then notes are taken upon the habit of growth, time of flowering, quantity of crop, and the quality is decided by chemical analysis. These plots, it is thought, are sufficiently large to give a good general idea of any particular grass experimented with. Each variety is tried in two or three different kinds of soil, and those which are considered most promising, are cultivated in much larger plots. I have spoken of some of the good points of Orchard Grass, and I hope some of you will try it. It is very valuable on dry lands. During the past summer I saw it thriving in the dry interior of British Columbia; but, at the same time, it thrives better, like most other grasses, on rich, moist soil. It will succeed even better than timothy on dry lands, and roots much deeper. Timothy is short-rooted and, feeding near the surface of the soil, is very exhausting as a crop. This is the reason why, unless it is top dressed, it seldom gives a heavy crop after the second year.

Another grass to which I would draw your attention now is the Meadow Fescue and its variety, the Tall Fescue. These are excellent perennial grasses which will produce an abundance of both hay and pasture. Some of our native grasses are also well worthy of mention.

For low land, Blue Joint is one of the most valuable. It grows naturally in marshes and along streams in all parts of Canada, but is seldom cultivated. This, however, might be done with ease by anyone who knew the appearance of the grass and would take the trouble to collect the seed. The stem is very leafy from the top to the bottom, and the flowers appear in the beginning of July. It will produce a large crop of hay of very fine quality, and a good deal of feed later in the season.

Growing in similar places may be found the Canary Reed grass. This is a much coarser grass than Blue Joint, but is of value as the succulent leafy stems are produced in great abundance early in the season. As early as the 3rd of June there will be stems over three feet in height, which is higher than spring rye at that time, and gives a much heavier crop of grass. This grass does not produce very much seed, but when once established on low or swampy lands it spreads rapidly by underground stems, and, as it does not root very deeply, it can be easily eradicated when that is thought desirable.

Perhaps the most valuable, as far as nutritive qualities are concerned, as well as for the amount of excellent feed which it provides, is the much-despised wild Canadian June Grass, or Spear Grass, as it is sometimes called. I think that perhaps the reason why this grass is so lightly esteemed is a want of appreciation on the part of farmers of the fact that it is essentially a pasture grass, and not a hay grass. As a hay producer it gives a very light crop of wiry, stemmy hay; but, in the early spring, and from summer until frost comes, it produces an enormous quantity of succulent green leaves of the very best quality, and, within reasonable bounds, the more it is cropped by stock the more feed it will produce. The proper name of this grass, which is used exclusively in England, is Smooth Meadow Grass (*Poa pratensis*), and it is the same grass which has made the State of Kentucky celebrated under the name of Kentucky Blue Grass. Now, it should be remembered that this grass is not "similar to," or "something like," but actually identical with the Kentucky Blue Grass, and the only difference is that, when you want to buy the seed, if you ask for it under the name of Canadian June Grass, you will pay about $1.25 a bushel for the seed, whereas if you ask for Kentucky Blue Grass, you will pay a good deal more for the same thing. (Laughter and applause.)

Closely allied with June Grass is the Flat-Stemmed Meadow Grass, generally known under the name of Wire Grass. This is an extremely nutritious grass, and, although it produces rather a light crop, it is an exceedingly valuable variety for sheep pastures and dry uplands.

One of the imported grasses which I believe will be of great value to Canadian farmers, particularly in Manitoba, the North-West and British Columbia, is the Awnless Brome Grass which was introduced some eight years ago by the Experimental Farm, and of which samples have now been distributed to all parts of the Dominion. Such reports as have been received have been uniformly favorable, and I am sure that the addition of this plant to our known fodder plants has been of enormous benefit to stock-raisers and dairymen. It produces a heavy crop of excellent hay, and, although rather coarse in texture, is very palatable, and has a sweet odor. In the eastern provinces this grass will not be such a boon as in the west. It has one drawback, namely, that it increases with a running root-stock very similar to that of the well-known pest Quack Grass. This may be considered a great detriment by some; but, as in the case of Quack Grass, I think it will probably be only lazy people who will neglect such a valuable grass for the sake of a little trouble in getting rid of it when that becomes necessary. There are, too, on all farms many small pieces of irregular or broken land, as the corners of fields where such a grass could be cultivated in the place of the weeds which now occupy these spots.

In addition to the grasses which have been grown separately at Ottawa, we have tried a great many hay and pasture mixtures which have given good results in a greater or lesser degree. There is one mixture which I have now tried for four years, and which attracted a good deal of attention from visitors last summer. This mixture was composed as follows:

Timothy	6 pounds.
Meadow Fescue	4 "
Orchard Grass	2 "
June Grass	1 "
Mammoth Red Clover	2 "
Alsike	2 "
White Clover	2 "
Lucerne	2 "

In all twenty-one pounds of seed. This has given three heavy crops of hay, and will now produce pasture for another two or three years, when the land may be broken up again with ease, for none of the varieties used are of a persistently aggressive nature; consequently, when the land is required again for alternate husbandry it will be ready for use after a single plowing. Should the land be low and wet, one pound of Red Top seed may be added to the above mixture. Of all the general mixtures we have tried—by a general mixture, I mean one that is suitable for ordinary good farm land, upon which ordinary crops can be grown—the above has given the best satisfaction; the grasses mentioned will thrive well in nearly every part of Canada, and what is of great importance, the seed of all the varieties can be obtained without difficulty. Before sitting down I should like to draw the attention of those present to one of the clovers I have recommended, namely, Lucerne, which is also known in the west under the name of Alfalfa. Where this clover will grow at all, it is a very valuable fodder plant, and if cut when young, gives a very heavy crop of succulent, nutritious and palatable feed. When made into hay it also produces an article of the very best quality. I am aware that it has been tried by a few in this part of Ontario, but I think it is worthy of the attention of all. There are many other kinds of grasses and fodder plants of which I could speak, but I think it will be more profitable if those present will indicate by questions upon what varieties information would be most useful.

A MEMBER: Have you any experience with a grass called Saccaline?

Mr. FLETCHER: We have another name for that plant, and it is "Humbug." (Laughter.) We have a circular from the men who are selling the seed that it will give fifteen or sixteen tons of fodder to the acre. It has been recommended to us as a fodder plant that would grow on dry land and be very succulent. It is highly improbable that it will succeed with us. It grows along the rivers in its

native island of Saccaline. We grew it at Ottawa, and it looked nice and succulent until early in June, when it was frozen to the ground. It shot up again about two feet, but the whole growth was of a harsh, woody nature, and had very little nutritious value. There is nothing in it that would recommend it to the farmers of Canada.

A MEMBER: What is the best mixture for a lawn?

Mr. FLETCHER: For a lawn there is no grass anywhere that can surpass our own June Grass. You need to take into consideration what is desired in a lawn. You want not only an even texture, but also an even shade. These can be secured only by sowing one grass, and the best for this purpose is our own Canadian June Grass, or as it is called in England, Lawn Grass.

Mr. C. NELSON: I like your mixture well except the lucerne. I have grown lucerne on my land and I could not get the mower to cut it, nor could I get my team of horses to plow it up. (Laughter.) I had to get the boy to take an axe and cut it up. (Renewed laughter.) I dug down and found the roots three feet deep. One man examined a stalk and root and thought it was a rose bush. (Loud laughter.)

Mr. FLETCHER: I think you cut it too late. As to the length of the roots, they will run six feet without any trouble.

Mr. STILLMAN: I found a root that reached fifty-four and one-half inches.

Mr. FLETCHER: A deep root is an advantage as it carries down deep into the soil that most valuable fertilizer, nitrogen, which the plant takes from the air. We tried all the different kinds of clover, and red clover and alsike went down nearly three feet. I think it would pay farmers to sow clover with every crop they sow, and later on plow the clover under for the great fertility the nitrogen contained in the crop gives to the soil.

Mr. NELSON: How would lucerne affect a new orchard?—it killed mine.

Mr. FLETCHER: In the United States all the legumes, such as the clovers and peas, are sown for plowing in, so as to enrich the soil.

Mr. W. MOORE: What do you think of Crimson Clover, as compared with other clovers?

Mr. FLETCHER: I do not think much of it. The hay is a fine soft sort, but it is not better than that of the other clovers. It is acceptable to a good many kinds of stock, but it has very little growth. I think it would be a mistake to grow it for the nitrogen it gathers. On account of being an annual it has small roots, and therefore gathers very little nitrogen. The other clovers lay by a store of nitrogen to feed the plant for future years. However, Crimson Clover is a good clover for bees.

Mr. MEIKLEJOHN: What kind of grass would you advise for old swampy land, say, one that had been a tamarack or cedar swamp?

Mr. FLETCHER: Red Top, Canary Red and Blue Joint, and also June grass.

ASSOCIATIONAL AMENITIES.

The Secretary then read the following telegram from the Western Dairymen's Association in session at Woodstock:

WOODSTOCK, January 8th, 1896.

The Dairymen of Western Ontario send greetings, and wish your Convention as great success as our own, now going on.

A. PATTULLO, President.

After the applause with which this fraternal message was received had subsided, the President read the following answer, which the Convention endorsed as its own unanimous sentiment:

CAMPBELLFORD, January 8th, 1896.

Thanks for your kind wishes, which are reciprocated by us. This, our first session, is a great success, over 300 farmers being present.

E. KIDD, President.

The Convention then adjourned, to meet at eight o'clock.

FIRST DAY—EVENING SESSION.

When Mr. C. L. OWEN, ex-Warden of the county, took the chair at eight o'clock the Music Hall was packed to the door, and many people had to stand. Nevertheless, the order and attention was all that could be desired. The town orchestra was present and played acceptably.

Mr. OWEN said: In the absence of the Reeve I have been requested to preside at this important gathering, and I consider it an honor to do so. The citizens of Campbellford are in hearty sympathy with this great dairy industry, so much so that we purpose entertaining the delegates to a banquet to-morrow evening, as a mark of our respect and appreciation. (Applause.) I wish to say, as a manufacturer, that the manufacturers are not enemies of the farmers. Let all classes of the community, farmers and manufacturers, producers and consumers, go on, hand in hand, in mutual confidence and helpfulness, and help to build up our common country. (Applause.)

ADDRESS OF WELCOME.

Mr. C. SMITH, on behalf of the citizens of Campbellford, read the following address:

To the Eastern Ontario Dairymen's Association.

GENTLEMEN,—On behalf of the municipal council and citizens of Campbellford, in which you have been pleased to hold this your annual Convention, we have much pleasure in conveying to you a message of welcome.

We believe that dairying is an industry of the first importance to our country, and we trust that your sessions will be productive of benefit to the farming interests of this community as well as to yourselves.

As ours is mainly an agricultural country, we think that all efforts and organizations tending to promote the development of this industry should receive the support and co-operation of all classes.

It is evident that as mixed farming has become necessary we should all recognize the desirability of receiving instruction concerning the most effective modes of employing labor to obtain the best results in the arts of butter-making and cheese-making.

We extend to you the hospitality of our town, and trust that your stay amongst us will be mutually enjoyable and beneficial.

On behalf of the citizens,

C. L. OWEN,
CHAS. SMITH.

The PRESIDENT: On behalf of the Eastern Dairymen's Association I thank you for your kind address of welcome. We accept it with great pleasure, and will be pleased to return to Campbellford at some future time. I must thank the citizens of this enterprising town for the generous and hearty manner in which they received our Secretary when he came here and solicited advertising for our prospectus. That pamphlet has been a credit to both the Association and the town, and, while we have received much benefit from its publication, Campbellford has also made a name for itself through its pages as a progressive and up-to date place. I can assure you that the Association does not regret visiting your energetic town.

DAIRY EDUCATION.

Mr. D. DERBYSHIRE: I am sure I feel delighted to be in Campbellford tc night, to witness this magnificent gathering in the cause of progressive dairying. I have attended most of the dairy conventions for years, but I never remember seeing so large an attendance at the first day's sessions. Years ago Mr. Whitton said, "Come to Campbellford and you will have a grand time of it." I think he knew what he was talking about. I am glad to see a manufacturer presiding at this gathering of dairymen. (Applause.) Let us ever be a united Canadian people—not divided by class prejudices. I purpose to speak briefly to-night upon the subject of dairy education. We have cause for pride in the fact that the Ontario Government have established at Guelph an Agricultural College which is the best equipped and most effective of its kind on the continent of America to-day. (Applause.) That institution is for the benefit of farmers' sons, to show them how to engage in the farming business so as to make money and improve their standing in every particular. All these advantages are at a nominal charge—in fact in many instances free so far as the actual tuition is concerned. We have at Kingston another splendid institution in the school which gives more particular attention to the education of cheese and butter-makers. This, with the dairy school about to be established in Strathroy, in the western part of the Province, will furnish our young men with the easiest opportunity of mastering the principles of modern dairying. But while we are delighted with the progress we have made in extending our dairy business, and proud of our achievements when exhibiting against the world, we have still to go forward. The report of the Director of Agriculture at Washington is not very hopeful in regard to the dairy industry in the neighboring republic. Skimmed cheese, filled cheese and other adulterations have so depressed the markets that for years their exports for cheese have been going down. In 1880 we exported only $3,500,000 worth of cheese, and we thought we were doing pretty well. The United States in that year exported $12,900,000 worth. But last year—only fourteen years after—their exports of cheese had fallen to $7,500,000 worth of cheese, a decline of about 40 per cent., while our export of cheese has amounted to $16,000,000 in 1894, an increase of over 400 per cent. (Applause.) If we do what the Government is encouraging us to do, and use the facilities so freely provided us on every hand, we can continue to make and sell first class cheese and butter, which will take the place of inferior goods from other countries. Let it ever be remembered that we want quality first. If we send our apples away let the apples be good all through the barrel. If we export dairy goods to Britain let us see that we send only the best cheese and the finest butter to that great food-consuming country. The poet has truly said: "The farmer he must feed them all." Yet he cannot do all the manufacturing there is to do. There is, too, a certain amount of independence on the part of the farmer, and a certain degree of interdependence also so far as his relations with the manufacturer are concerned. The little blacksmith shops at the corners have disappeared, and the large establishments are making better goods at lower prices. We cannot fight against a certain degree of centralization. In short the little home dairy, whether for butter or cheese, cannot successfully compete with the larger co-operative establishments. We must not attempt to make cheese for over six months—or perhaps for that length of time. Cheese should be made only while we have the best grass and the freest milk flow. Let us make butter in the winter time. We have the Mallorytown Butter Company established on a proper basis. It is well built, warm and thoroughly equipped. We have creamery stations, and the cream is sent to Mallorytown and there made into butter. The milk during the summer is made into cheese, but in winter they take off the cream for the Mallorytown butter factory and the skimmed milk is kept to feed the young stock. At Messrs. Dargavel & Murphy's establishment at Elgin they have the largest butter-making concern in the Province, and things are prospering there also. We must take these lessons to heart, and centralize our operations just as the manufacturers of other goods do. We are able to lead the world in butter-making as we do in cheese. At the Chicago Exposition I was proud of our display of dairy and other goods, but I felt

prouder as I saw the quality of the men from Canada who were over there. And if our men surpass those of other nations how much more do our ladies? (Applause and laughter.) And I am persuaded that the men and women engaged in this great Canadian dairy business will continue to lead the world.

THE CULTIVATION AND CARE OF HOUSE PLANTS.

Mr. JAMES FLETCHER spoke at considerable length upon the attractive subject of "House Plants, their Care and Cultivation." He maintained that there was no subject which affected so nearly the happiness and comfort of a home as a love of the beautiful in nature on the part of the better half of every household, whether she might be the wife of a diaryman, a farmer, a professional man, a plowman or a king upon a throne. Flowers might be taken to be types of all that was beautiful, and the speaker dwelt in eloquent and enthusiastic terms on the many beautiful forms presented by an intelligent study of the different parts of a plant. He drew attention to the beautiful shapes and colors of flowers and leaves, as well as to the symmetry and grace of the various bushes, trees and plants which bore them. The love of flowers, he claimed was a source of pleasure and comfort to everybody in all grades and conditions of life, particularly instancing the pleasure which could be given to a sick person by a little bunch of flowers. He maintained stoutly that a love of flowers, as well as a love for those who love flowers, was a part of the duty of the dairymen assembled. During the course of the address the attention of the audience was held by apt anecdotes and florid descriptions of the beautiful flowers and scenery which could be found in the Eastern provinces, on the Western prairies, even on the cold summits and slopes of the Rocky Mountains and in the dense luxuriant groves of the British Columbian woods. Having treated of the advantages of growing window plants as a beautiful addition to the decorations of a home, and spoken of the moral influences of cultivating and studying the beautiful, the speaker passed on to a detailed description of some of the easiest and best methods of cultivating and particularly of propagating some of the best known house plants. Flowers were grown for the beauty of their blossoms, their graceful foliage or their delicious odors. Some plants were far easier to cultivate than others, and he recommended from his own experience some varieties which had given the best results. Geraniums were given the first place as satisfactory house plants. These should be of definite colors but should not all be alike. It was worth while considering in the autumn what were the best varieties, so as not to care for a plant all through the winter which would not give an abundance of flowers with all the qualities desired. He stated that a little knowledge and thought of this matter would be well repaid by the results, and the names of the best varieties of scarlet, white and pink geraniums were given. Abutilons, Begonias and Fuchsias were treated of in a similar manner and many of the other old favorites—Calla lilies, Oleanders and Primulas came in for a share of attention. The best way of treating bulbs of various kinds was also explained, and in finishing up the lecturer advised all the ladies present to take every precaution to protect their favorites against the insects which sometimes trouble them in their houses. A pleasing analogy was drawn between boys and house plants, and it was shown how both responded readily to proper training and care. The use of soap was freely recommended, and although tobacco could not be advised for use by boys it was a very useful substance, and if the ladies present did not use it themselves it was suggested that they might get their husbands to do so for them, and the speaker felt certain from his own experience that the husbands would feel much better for it and the plants would be much improved by being cleared of their insect enemies.

After a cordial vote of thanks to the chairman and the orchestra, the meeting adjourned until 10 a.m. on Thursday.

SECOND DAY—MORNING SESSION.

After spending an hour in visiting some of the industries of Campbellford the members of the Association repaired to the Music Hall, where the President took the chair and called the meeting to order.

REPORT OF INSTRUCTOR BENSLEY.

Instructor BENSLEY read his report as follows: I have much pleasure in submitting this my third annual report to the Association of the work accomplished in the district allotted me for the season of 1895. The territory I had was the counties of Addington, Lennox and Frontenac. I visited 69 factories. The names of factories and number of visits each received are as follows:

Palace Road	3	Bedford	1	Sand Hill	2
Newburgh	3	Sharbot Lake	1	Glenburnie	2
Centerville	5	Oso	1	Arigan	2
Tamworth	2	Mountain Grove	1	Woodburn	1
Croyden	5	Arden	1	Central	2
Forest Mills	2	Long Lake	1	Cold Spring	2
Selby	2	Parham	2	Sunbury	2
Empey	3	Tichborne	2	Bear Creek	2
Camden East	3	Crow Lake	1	Keenan & Son	2
Enterprise	5	Wagerville	1	Maple Leaf	2
Sheffield	3	Inverary	3	Pine Grove	2
Clareview	3	Battersea	2	Pine Hill	3
Moneymore	2	Excelsior	2	Granite Hill	2
Albert	1	Model	2	Thousand Islands	1
Farmer's Friend	2	Wolfe Island	1	Morning Star	2
Cataraqui	3	Gilt Edge	1	Rose Hill	2
Glen Vale	2	St. Lawrence	1	Odessa	1
Forest	2	Silver Spring	1	Whitman Creek	2
Railton	2	Ontario	1	Deseronto	1
Harrowsmith	2	Lake Shore	2	Platt	1
Hartington	1	Union	2	Sillsville	1
Desert Lake	1	Perth Road	2	Bell Rock	1
Verona	2	North Shore	2	Moscow	1

In accomplishing this work I spent 145 days in the employ of the Association. The amount contributed by factory men for my services was $400. The net amount from fines was $125, making a total to the Association of $525. The number of patrons fined was thirteen.

As you are aware, the district allotted me this year was a new one to me, but, as in other sections, I found the same common fault prevailing among makers, namely, overripening their milk and running their curds too fast, which is very damaging both to quantity and quality of cheese made. I found makers running curds as fast as two and two and a quarter hours from time of adding rennet to dipping, when it should take not less than three hours, unless in case of gassy milk, which might be ripened a little lower. Another fault that was very noticeable among a great many makers was carelessness in style and finish of cheese, for which there is no excuse.

In conclusion let me give a word of advice to patrons. Use nothing but tin pails for milking in, keep them clean, aerate the milk properly, send it to the factory in the best possible condition, and by so doing you will greatly help the poor cheese-maker and benefit yourselves.

All of which is respectfully submitted.

G. H. BENSLEY.

Mr. WHITTON: Did I understand you to say that the prevailing fault was the over-ripening of milk?

Mr. BENSLEY: Yes, and this gives too tender a body to the cheese.

Mr. H. R. FREE: Do you not generally find the milk over-ripened in the spring?

Mr. BENSLEY: I find it during the whole season.

Mr. MCCARGAR: Do you not find a number of makers keeping over a quantity of old milk in order to hurry up the work? I think it a mistake.

Mr. BENSLEY: So do I. I believe in a "starter" in the fall if they do not keep too much of it.

Mr. POTTER: Prof. Robertson advocates a starter all through the season, except perhaps in the spring.

Mr. RENNICK: If the milk was very gassy would you advise a starter?

Mr. BENSLEY: Yes, a little of it. In the hot weather you can ripen your milk in a reasonable time and consequently you do not require a starter. Much, of course, would depend upon the gassiness of the curd. With a gassy curd you might start to cook in two hours and a half.

Mr. MCCARGAR: I think there is a loss in keeping over too much milk.

Mr. F. E. CLINE: Would you advise heating up gassy curd for a little while before stirring?

Mr. BENSLEY: Get rid of gassiness in the curd as early as possible.

Mr. WHITTON: The best way to kill it is for patrons of factories to take proper care of their milk.

Mr. R. W. WARD: Suppose you have to take milk and keep it standing for an hour, would you recommend a starter in that case?

Mr. BENSLEY: I do not think an hour would make much difference, but if you have to keep it two or three hours I would advise a starter. I do not think that the curd will cook properly in less than three hours at any time of the year. The curd requires more cooking in the fall than in the spring months.

Mr. WARD: Do you need to extend the time very much?

Mr. BENSLEY: You do not need to make much difference. However, the curd should be cut a little finer in the fall, which will admit of a more thorough cooking. I would advise four hours in the fall and three hours in the summer.

Mr. FREE: Suppose you find that your curd has a bad flavor, is it best to try to remove that flavor in the earlier stage?

Mr. BENSLEY: Yes, I think so.

Mr. MCCARGAR: Don't you think a great deal of curds are injured in the making-room by having the factory too cold?

Mr. BENSLEY: Yes; the curd gets chilled, and you cannot make first-class cheese under these conditions.

Mr. DERBYSHIRE: It is good policy to heat not only the making-room, but also the curing room. Every room should be so comfortable that you could work with your coat off and look as if the surroundings agreed with you.

INSTRUCTOR GRANT'S REPORT.

Instructor GRANT then read his report, which is as follows: I have much pleasure in submitting to this Association, my second annual report of work done in the sections allotted to me, viz.: Peterboro', Campbellford, Stirling and Tweed.

In these different sections Campbellford was the only one in which nearly every factory applied for my services. Owing to the factories that desired my services being so scattered, a great deal ef extra travelling was necessitated, which took up much valuable time. The last month of the season I was assisted by my brother I. S. Grant, whose work, I believe, gave general satisfaction.

A number of factories in Belleville section applied for inspection during the latter part of the season, but owing to the amount of work I had to do at that time I was unable to visit them.

The work done by I. S. Grant will be included in this report.

Following is a list of factories visited :

Factory.	Visits.	Factory.	Visits.	Factory.	Visits.
Warkworth	3	Union Otonabee	2	Cook	2
Woodland	2	Central Smith	2	Clair River	2
Goose Creek	2	Tweed	1	Cherry Grove	3
Riverside	2	Ormonde	1	Cedardale	2
Aggett's Model	2	Ryleston	2	Evergreen	2
Newcomb's Mills	2	Valley	2	Forest	2
Trent Bridge	2	Victoria (Peterboro')	2	Keene	2
I X L	2	Victoria (Hastings)	2	Kingston	2
North Star	2	Roblin	2	Lakeview	2
Stanwood	2	Wicklow	1	Lang	3
Plum Grove	3	Warsaw	3	Maple Leaf (Peterboro')	3
Empire	2	Westwood	3	Maple Leaf (Hastings)	3
Crow Bay	3	Enterprise	2	Myersburg	2
Tweed	1	Daisy D	2	Monarch	2
Ormonde	2	Abbey Melrose	2	Marmora	2
Roundlake	2	Shearer	3	Millbrook	3
Ida	2	Spring Valley	3	Missing Link	3
North Dummer	3	Baltimore	1	Seymour West	2
Standard	1	Brighton and Murray	1	Stoco	2
Thomasburg	2	Big Springs	2		
Roseneath	2	Bensfort	2		

In accomplishing this work 129 days were spent and seventeen days taken up travelling, attending Cheese Boards and lecturng at factories, making a total of 146 days in the employ of the Associetion.

The amount contributed for inspection and instruction by factory men was, $339. Amount received from fines, $89. Total, $428.

In all 7,388 samples of milk were tested with the Quevenne lactometer and 4,995, with the Babcock test ; of this number fifty-two were found to be deterioated.

I dealt with twenty of the cases and the remaining thirty-two were looked after by the various factories in which they occurred, and as near as I could learn, the several factories collected from the persons accused the sum of something over $300.00.

I had five persons brought before a magistrate for milk adulteration, four were fined, one being dismissed without costs. One man appealed against the magistrate's decision to the High Court of Justice in Toronto, but the conviction was sustained and defendant paid all costs. The utmost caution was taken in every instance to prove either the guilt or innocence of the persons accused. I find it is only here and there in a factory, now, that people tamper with their milk. Still quite enough that they should be looked after.

In my report last year I made reference to a factory in which fines to the amount of $175 had been imposed. The factory was an old delapidated building, and unfit for the manufacture of cheese. The whey was returned to the patrons in the milk cans, and a large number of them tampered more or less with their milk. With the assistance of the president and directors of this factory I succeeded in proving the guilt of the several persons accused. Such a revolution took place in that neighborhood that, this year, I found a fine new factory, in which first-class cheese was being made, well constructed hog-pens at a safe distance from the factory where the whey was fed sweet, and all the patrons sending good and honest milk.

It would be a material benefit to the cheese industry of Canada if many more such revolutions were to take place.

It is well known that the past season has been rather discouraging to factory men and cheese makers, more especially to the maker who has had little experience. Should the coming season prove to be a similar one there will certainly be a weeding out among the makers, and the skilful man may then hope to get a just reward for his services. Owing to the weather being so changeable in the fore part of the past season, the skill of our best makers was taxed to the utmost; nevertheless I think we received an experience which we may profit by in the future.

I heard a general complaint among the buyers last season that the cheese lacked body, caused, I think, by makers not using sufficient rennet, and not cooking the curds properly. If milk be set at the proper stage, and the curds well cooked when ready to dip, I maintain that the hardest task of the cheese-maker is over, because if a curd is not properly cooked it is almost impossible to get a good bodied cheese.

I find more trouble arising from too low cooking than from cooking too high. In many instances I found thermometers to be from two to five degrees out.

In conclusion, I would urge factory-men to have their factories properly equipped for the manufacture of first-class cheese, employ none but skilful makers, and pay them a reasonable salary.

Again, I would like to impress strongly on my fellow cheese-makers the great importance of giving to all details relating to their business the closest attention, for it is a business that will not admit of carelessness or neglect without loss of reputation, the loss of which makers cannot afford. And in justice to our patrons, who supply the milk, and are becoming every year more alive to their interests, and justly so, it behooves us to do all in our power to improve the quality of our product. This means better prices, and more money in their pockets. On the other hand, we will expect them to supply us with pure and honest milk, and by working harmoniously together, we will still be able to maintain the proud distinction Canadian cheese has already won.

W. W. GRANT, Instructor.

Mr. DERBYSHIRE: Regarding the prosecution of suspected patrons, do you not think this trouble of law trials, and the breaking up of church relationships might be largely avoided if men were paid by the Babcock test? Pay a man for what he puts into his can, for quality as well as for quantity, even if it be water. It is a humiliating thing to put a good Christian man into court and try to make him out to be a rascal.

Mr. DARGAVEL: Perhaps that will convert him. (Laughter.)

Mr. DERBYSHIRE: Perhaps it might. But, seriously, I would like to see a plan adopted which would do away with all these charges in the court. (Applause.)

Mr. EAGER: How many cheese factories in your district pay according to quality?

Mr. GRANT: I think there are five in the county of Peterborough. I visited only one of them. They did not require any milk inspector at these factories. (Applause.) There is another factory in Hastings county paying according to test of butter-fat. I do not know of any in Northumberland, but there is one in Prince Edward.

Mr. MCCARGAR: Do you not believe that if milk was tested by the Babcock and paid according to its value, that it would relieve inspectors to a great extent and enable them to devote more time to the more legitimate and pleasant occupation of giving instruction in cheese-making?

Mr. GRANT: Yes. It is impossible to test milk in a large factory and give proper instruction in making and handling cheese.

Mr. EAGER: I think it is honest, just and right to pay by the fat test.

Mr. GRANT: In those factories where the test is used I believe the patrons take better care of their milk and are much more interested in the work done. In the milk

sent by one man the percentage of fat dropped from 3.8 to 3.4. He said he thought a mistake had been made in the registering. I told him that I did not think there was a mistake, but that he did not take the same care of his milk. I found that the milk was rather clotted; I had shoved some of these clots aside, as I thought such clotted milk would go off a good deal in the whey. He went home and stirred his milk, and thus incorporated that fat, and the test went up about half of one per cent.

Mr. DERBYSHIRE: I think that when the Babcock tester shows a man that his milk gives only three per cent. of fat, while his neighbor's milk runs as high as three and a half and four per cent., it starts an enquiry in his mind, and an enquiring mind is what we want. Such a man will at once start to examine his cows and weed out the poor milkers. This will also prevent suspicion among neighbors. It means a more friendly and united people, more cheese and better cheese. I believe the day will come very soon when you will find the people from one end of the country to the other demanding such square dealing. Good neighborship means that one man is a good friend of the next man, and that each will do the just and honest thing by the other. Now, suppose that I go to town with the President to sell our horses. Mine is worth $100 and the President's is worth only $90. The President says to me, "Mr. Derbyshire, we are good neighbors; let me get $95 for my horse, and you will get $95 for yours." But I will say, "My dear fellow, my horse is worth $10 more than yours, and I cannot afford to lose that by equalizing our values." So he gets $10 less than I do, instead of receiving the same amount of money, and he thinks it is not fair for me to get more than he does. But is it not? And the case is precisely so with milk, for there is a quality in milk as well as in horses. In the past we did not understand the fat test; but now in the Babcock tester we have a machine that will do the work cheaply and honestly.

Mr. JAMES MERRELL: Do you think the food has anything to do with the quality of the milk?

Mr. DERBYSHIRE: The character of the cow—the blood or breed of the cow—has more to do with the quality of the milk than anything else. You may say that the character of the cow fixes the quality of the milk, but that the food will improve the amount of milk given on account of the better condition of the cow. The Jersey cow's tendencies prove that that breed has been encouraged to give a lot of fat in her milk, and she is more particularly a butter cow; but a Holstein will give a greater flow of milk, as it has been bred to furnish milk to cheese factories according to weight, and not according to quality. But the main thing in furnishing our milk on the co-operative plan is to get the business down to an honest basis.

Mr. MERRELL: Is not the milk containing more fat and other solids heavier than poorer milk?

Mr. DERBYSHIRE: Yes, a little.

Mr. EAGER: I am greatly interested in this matter. The Babcock tester is revolutionizing things. But some farmers say, "You don't tell it all. It adds to the expense of running our business, and that is not wise to do in a poor year." Now, there is such a thing as being penny wise and pound foolish. In this dairy business the better we can put our work upon a good paying basis the better for us. I will tell you how we can work it. We have combination factories in the east. These are owned by one person, or firm, or by a joint stock company, being under a single control. If you have not such a combination, you might still work out the idea so far as the test is concerned by about twenty-five factories agreeing together to hire a competent man to do the work for all. In our combination we test every two weeks. The milk is taken from the can after being stirred with a dipper, and we have a sample bottle for every man's milk. The bottle has a wide mouth, a large neck and a good cork. These bottles are then placed in a rack, and this is done daily for two weeks. At the end of that time the milk is tested by a competent man. Hire the very best man you get to do this work. We pay our man what some people would term a big price, but it pays us to do so; and what is the result? Things are working in a different shape altogether. The people enquire why they do not get as good a result from the test

as others do, and they soon decide to look better after their milk and see if that will help in the test. The fellow who is slipshod and doesn't want to do as he should will be brought to time just here. When he was pooling his milk he didn't care; but now he has to look out for himself. The use of the Babcock tends to get people out of the rut and causes them to put more care and intelligence into their work. You will find that paying for milk according to quality is the proper way, because it is the honest way.

Mr. DARGAVEL: How do you manage to keep it for two weeks?

Mr. EAGER: We use bichromate of potash, and we have little or no trouble with it. We warm our bottles before making the test, and get everything in them well mixed. We have an honest people in our section, but they are more satisfied since we adopted the Babcock test.

Mr. FREE: Is a less amount of milk required to make a pound of cheese since you adopted the Babcock?

Mr. EAGER: Yes.

Mr. DARGAVEL: Do you require more men in each factory under the test?

Mr. EAGER: No; I have only one man for all my factories.

Mr. POTTER: Can you not keep the milk for a month for less frequent testing?

Mr. EAGER: I hardly think so. I would not like to try it.

Mr. POTTER: I have done it for a month, and it proved successful.

Mr. EAGER: I am glad to hear that. But we were afraid to try it for fear the patrons would object. We did, however, keep samples from November till March, and when we then tested the milk we found it to agree exactly with the test made in November.

Mr. MCCARGAR: In practising this test, do you think it makes any difference whether you pour the acid straight into the milk or along the sides of the bottle?

Mr. GRANT: It does make a difference, and requires some experience. If you pour the acid right into the milk the action will be too sudden, and the fat will get dark. Hold the bottle slanting and let the acid run under the milk as much as possible. If you happen to let it drop into the centre it will curdle.

Mr. EAGER: That shows the importance of having a thoroughly competent man. In comparing the two systems—the old one of pooling milk, and the new one of paying according to quality,—I say again that the first is absolutely wrong, because it is dishonest. A few years ago we had nothing better than the pooling system, but now we have a better plan, and we must adopt it or other people will take our business from us.

The PRESIDENT: Do you add two per cent. to the readings?

Mr. EAGER: No; we go absolutely according to the readings. If we add two per cent. a man will say: "Why do you add that two per cent. if the Babcock test is absolutely correct?" But if we find later on that it is better to add two per cent. to the readings, all right. But at this early stage it is not wise to make the people suspicious.

Mr. MORDEN: That factory in the county of Hastings which uses the Babcock tester is within three miles of my home. All the patrons I have talked with seem to be satisfied but one, and he is a man who does not take care of his cows. This year they have added the two per cent., and appear to be satisfied with it.

Mr. FREE: I am thoroughly in favor of the Babcock tester. It has been very badly represented from the start. At first it was said that it was so very simple that a child could handle it. Now we are told that only a competent man can manage it. In pouring in the acid you certainly should give it careful direction. There is a trouble in paying by the Babcock test. If it is handled properly it is an advantage, but if it is not carefully and properly handled it is unfair. It requires a first-class man if justice is to done to all parties, and you are to retain the confidence of your patrons. Unfortunately to-day every man is after the man who will run the factory cheaply. If we are to have

good cheese, we must have good men to make it. I did not pay by the Babcock test this season, as I was not certain of its manipulation. However, I know more about it now.

Mr. McCargar: If you do make a mistake with one man occasionally, is that as bad as making a mistake continuously with the best patrons under that pooling system?

Mr. Purvis: The trouble down in the county of Glengarry is exactly as Mr. Free has said, on account of the cheese-makers being required to do the testing. There are some makers there who never saw the Babcock tester until the machine was sent to them with instructions, and that bred dissatisfaction. Patrons feel, in some cases, that the makers do not understand the system.

Mr. Derbyshire: That is just what Mr. Eager says. He tells us that one good man can test for twenty factories, as they happen to be located within convenient distance of each other. If each factory will pay its proportion of the test it will come light so far as expense is concerned. It has got to come. The people will demand it, just as quickly as the farmers come to clearly see that this thing is all right. This method of paying according to the quality of the milk has got to come, because it is based upon an honest principle.

THE HORN FLY.

By special request of the directors Mr. Fletcher gave an address upon the horn fly. He said that as Dominion Entomologist he found that dairymen, as well as all others engaged in the various branches of farming, found it advisable to consider some of the subjects in the study of which he was engaged. There is no branch of agriculture in which information is not frequently required concerning the losses from injurious insects, and dairying is no exception to this rule. Perhaps the insect which has caused the greatest amount of loss to dairymen during the last three or four years is the so-called horn fly. These losses, both in dairy products and in beef, have drawn the attention of the most careless. The horn fly is not a native, but was introduced into America, probably into the State of New Jersey, about the year 1887. Thence it had spread rapidly in every direction, until the year 1892, when the first specimens were taken in Ontario at the end of the month of July. A character of the occurrence of this insect in any locality was that for one or two years it appeared in enormous numbers and did much harm by worrying cattle which, in consequence, fell off considerably both in flesh and in the quantity of milk produced. The latter loss was so great in some districts in Ontario during the year 1894, that, according to reliable data gathered from managers of cheese factories, it attained the enormous proportions of nearly half of the whole supply of previous years. This great decrease naturally drew the attention of farmers, and many adopted the practical remedy that had been devised by entomologists (that is, those who made a special study of the lives of insects), and the means of preventing their injuries. The speaker had had an opportunity of studying the horn fly soon after its first appearance in America. He had had the good fortune of taking a trip for this special purpose down into Virginia with Mr. Howard, now the United States Entomologist. An important advance was made when it was found out definitely how the insect passed through all its preparatory stages.

It was perhaps unnecessary to explain to those present that all insects passed through four stages. First of all there was an egg, laid by a female, from which was hatched the second stage, called the larva. This varied in form in the different orders of insects, and popular names were given to each, as, for instance, the larva of a fly is called a maggot; of a beetle and wasp, a grub; of a moth or butterfly, a caterpillar, and so on. Such indefinite terms as "worm," which is generally applied to any larval form, should not be encouraged, because there are proper terms, which are much more definite. In the case of the horn fly there were many inaccurate statements made upon its first appearance which were the cause of much loss of time and useless work on

the part of farmers from mistaken ideas as to its life history. For instance, it was stated freely through newspapers that the eggs were laid on the horns of cattle, where they hatched and ate their way into the head of the animal, or that they were laid on other parts of the body and then fed inside the animal. It was a common practice at one time for farmers to tie greasy or tarred rags round the horns of animals to keep the flies away. All of this was useless work, and must have been very unpleasant for the animals so treated. The complete life history was worked out very soon after it first appeared in America, and within a month after its appearance in Canada published information as to its life history, and the best remedies were available for all who applied at the Experimental Farm. A short bulletin, No. 14, on this subject, was issued early in September. The speaker here urged all farmers present to apply promptly to the Experimental Farm to try at any rate whether they could not get some useful information whenever they found insects troubling any of their crops, and he on his part would promise that they would at any rate get a prompt and courteous reply, which he also believed would be in most cases a means of saving much actual money. He went on to describe the stages of the horn fly as follows: The eggs are laid singly on the fresh droppings of cattle during the warmer hours of the day. This is the only place in which the eggs are ever laid. They are never by any chance laid on animals. They are very small, being only about one-twentieth of an inch in length and, unlike the eggs of most insects, are brown in color, so that they are not easily seen on the droppings. The young maggots hatch in less than twenty-four hours, and at once burrow a short distance beneath the surface of the dung. Here they remain until full grown, feeding on the liquid portions of the manure. This is their only food, and all stories about their boring into horns, brains or flesh of living animals are untrue. The maggots are full grown in about a week, when they are about three-eighths of an inch in length and of a dirty white color. They then burrow down into the ground a short distance, and the third or pupal stage is entered upon. This is about a week after the egg hatches. In the pupal stage the body contracts to an oval form, of a dark brown color, without any legs or means of movement, and in about another week the brown shell cracks and the perfect insect emerges as a fully developed horn fly. During the hot weather of summer all of the stages are passed through in from fifteen to twenty days, and there are several broods in the season. The last brood of maggots turn to pupæ in the autumn, and the flies do not appear until the following spring. The perfect fly is too well known to most farmers to need much description, but it may be mentioned that it is a small fly about one-third the size of the common cattle fly or the house fly, of a dark grey color. The head consists almost entirely of the dark red, silvery-edged eyes, and bears on its lower surface a black, dagger-shaped tongue, which is the cause of so much pain to cattle. When very abundant these flies gather in thick clusters around the bases of the horns of cattle and such other parts of the body of the animal where they cannot be dislodged by a stroke from the tail. When they are settling on the horns they are doing no harm at all, for they cannot injure the horn in any way, and when there they are at least not biting the animals. Instances have been brought under the speaker's notice of animals having been dehorned so that the flies might not settle on the horns. As far as the horn fly was concerned, this was not a wise practice, because when the flies had not the horns to settle on they did settle on the animals and certainly did there much more harm by biting. He stated that there was great difference in the susceptibility of various breeds and of individual animals, according to their nervous temperament and the texture of their skins. The bites produce great irritation, and sometimes large sores are formed by the animals licking themselves or rubbing against trees, posts, etc. From the history of the occurrence of this insect in America we were able to anticipate confidently that before very long the losses from its attack would decrease very appreciably. In fact there is every reason to hope that within another year or two the injuries will be so slight that little attention will be required. In the meantime, however, wise dairymen will protect their animals and their own pockets by making use of some of the simple, cheap and easily applied remedies which have been recommended.

The question of a remedy was not very complicated. The only treatments which would come under consideration were the application of some material to the animals which would act as a deterrent and would keep the flies from settling on them and biting,

or some manipulation of the droppings to render them unfit as a breeding place for the maggots. This latter was easily accomplished by breaking up the droppings at short intervals by means of a rake, a hoe, or some other suitable instrument, so that in hot weather they would dry up, or when it rained they would be washed away to such an extent that the maggots could not live in them. The duration of the life of the maggot is very short, at most not over a week. This is a provision of nature to enable them to attain full growth before the time at which under ordinary circumstances the cattle droppings would become too dry for them to live in them. This breaking up of the droppings could be easily done by boys going regularly through the pastures twice a week, but in the present case, where experience showed us that this attack was likely to be of only short duration, preventive remedies by which the flies were kept away from the animals were the best. For this purpose, it has been found that any greasy substances smeared on the animals' backs, or such other parts as were liable to attack, was sufficiently effective to make it a paying operation for all dairymen and owners of stock to thus protect their animals. A number of experiments have been tried with the result that common train oil, or any other common cheap oil, alone or with the addition of a little sulphur or carbolic acid, had been found to keep the flies away for two or three days. The addition of carbolic acid also had the effect of healing any wound which might have been made. The remedy which had been found most convenient for application on a large scale was spraying the animals with the kerosene emulsion.

This emulsion consists simply of a mixture of soap-suds with twice the quantity of ordinary coal oil, made as follows:

Kerosene (coal oil)	2 quarts
Rain-water	1 quart
Soap	2 oz.

Boil the soap in the water till all is dissolved; then, while boiling hot, turn it into the kerosene, and churn it constantly and forcibly with a syringe or force pump for five minutes, when it will be of a smooth, creamy nature. If the emulsion be perfect it will adhere to the surface of glass without oiliness. As it cools it thickens into a jelly-like mass. This gives the stock emulsion, which must be diluted before using with nine times its measure, that is, twenty-seven quarts of water. It will be found to mix much more easily if done at once, before it cools.

The above proportions give three quarts of the stock emulsion which, with twenty-seven quarts of water added, make up thirty quarts of the mixture ready for use.

This may be applied to the animals either by means of a sponge, or what will certainly be found most convenient where there are many animals to treat, by means of a force-pump and spray-nozzle.

Prof. W. B. Alwood has found that the stock emulsion diluted ten times and mixed with one part of a water extract of tobacco waste (made by steeping one pound of tobacco stems in one gallon of hot water for an hour or more), gave almost perfect immunity for a period of three days, and that two treatments per week almost entirely relieved his cattle from annoyance. He makes the application with a knapsack pump fitted with a cyclone nozzle, and the work is done just after milking time. His method is as follows: The animals are driven into an enclosure through a gate which will only admit one at a time. A man with a knapsack pump on his back stands at the gate and sprays one side of each animal as it passes; they are then driven out again, and the other side is treated in the same manner. The quantity of liquid thus applied is very small, but has been found sufficient. We have tried this plan at Ottawa and found it to answer admirably. Many people, however, do not know what a valuable instrument a spraying pump with a good nozzle is to have on a farm, and they will consider it an unnecessary expense to obtain one. To these I would earnestly recommend the simple remedy of applying carbolized oil, or oil and sulphur, or the old remedy of lard and sulphur, which will keep off the flies and save their animals a great deal of pain and worry, and increase their own profits. With regard to a spraying pump I may point out that there is hardly a crop grown for the protection of which from its insect enemies such an implement

may not be advantageously used. There is no crop grown which has not many parasitic insect and fungous enemies. It needs very little observation on the part of practical agriculturists to see how great this loss is; but, strange to say, few of them seem to grasp the fact that these losses can be to a large measure prevented by simple and easily applied remedies. These, it was stated, were the studies upon which the speaker was particularly engaged, and he wished to draw the attention of those present to a fact which some of them might not have thought of—that he was their servant, that the work was being done for them; and that, as they were paying for it, it was not business-like for them not to see to it that he did his duty. He hoped in the future that he might have many applications for assistance and information about the many injurious insects which would undoubtedly be a cause of loss to the farmers of Eastern Ontario, as well as of every other part of the Dominion. He would not promise in all cases to remedy or prevent entirely the loss, but at any rate he would do his best.

The meeting then adjourned till 2 o'clock.

SECOND DAY—AFTERNOON SESSION.

The hall was well filled when the chairman opened the proceedings by complimenting the farmers of the district for turning out in such large numbers.

CHEAPENING THE COST OF THE PRODUCTION OF MILK.

Mr. John Gould, of Aurora Station, Ohio, was introduced as a leading dairyman from the United States, whose wise and witty words carried much weight on both sides of the international line. He said: I am glad to be with you, ladies and gentlemen, and for fear I should not get here in time I "sat up all night," and started for here at four o'clock this morning. I do not feel that I am in a strange or hostile land. Your interests are our interests; what affects your welfare will also touch ours. Instead of being enemies, both of our great countries have to stand shoulder to shoulder in the advancement of the dairy industry and of agriculture generally. We need to stand close together in order to get and keep the trade about us. I suppose you have hard times over here, just as we have on our side of the line, and perhaps some of you will lay it to the charge of the Government. Well, our President does go duck-hunting at critical times, (laughter), but there are other factors besides the political administration entering into the state of the butter and cheese business.

The cheapening of the cost of producing milk is one of the most important problems we as dairymen are called upon to solve. Unless we are able to reduce the cost of our milk supply, we who are in the business of caring for cows will have to admit that the Australian and Danish dairymen are better at this occupation than we are, and we are not yet going to put that admission on record. We can cheapen the cost of milk production only by having a cow better adapted to the dairy than the average animal now kept; by having a more suitable place in which to stable her, and by feeding her more cheaply, with more succulent and nutritious feed than now usually falls to her lot, especially during the fall, winter and spring months. I did some prophesying last winter, and it didn't come true. (Laughter). I predicted that the hard times had about passed over, and that we were going to have brighter skies. But this winter we are selling our milk at 90 cents instead of $1.10, and glad to get a fifty cent silver dollar for it. (Laughter). But the getting of more milk for the value of food given to the animal must be preceded by an education which will enable us to know what we want. We have been too willing, as a class, to get along with a cheap education. I was once one of those who thought all that was necessary was to know which end of the cow to sit by to milk. (Laughter). We must be educated to understand the cow. We must know something

more than that she has a leg at each corner. We must be taught to understand her, and to comprehend her needs and her capabilities. In the past we never properly studied the individualism of the cow, or treated her from this important standpoint. We never stopped to enquire why one cow gave more milk or richer milk than another. We have been feeding our dairy animals too indiscriminately. We fed a cow without properly considering what the animal really needed. It was: "Here is a cow and there is a hay stack; let her live through the winter if she can." And then we would go around in the spring enquiring the price of cow hides. (Great laughter). We must learn at the very first that in order to be successful we must understand our business just as well as any man who is a manufacturer understands his. We, too, are manufacturers, and the cows and the grasses and the grains are the things we are handling in our manufacturing, for through the medium of the cow the plant product of the earth is turned into an article called milk, which is in itself a finished article, although it may be further made up into such more finished articles as butter and cheese.

It is easier for us to eat ten pounds of butter than to eat 500 pounds of corn stalks. (Laughter). And that is manufacturing, pure and simple. We simply ask a cow to take 500 pounds of grass or corn stalks into her system, and concentrate it into pats of butter. We farmers must understand more than ever before what the things growing in the soil are composed of; we must understand how to produce and store away these plants in the best way, and then how to turn our product of milk into the finest goods. We must study the capacity of this living, breathing machine that we call a cow, and her adaptation of turning the food we have given her into milk, butter or cheese. In short, we must have a machine to do our work that can do it better than the old machine did. The old brindle cow was too common in the past as a milker. Who her father, or grandfather or aunt was, nobody knew or seemed to care. But the requirements of the dairy business of to-day cannot be met by the old brindle cow. I live very near the Benwood Nail Works, which turn out a car load of nails every ten hours. A few years ago nails were made by hand, and one man was able in ten hours to make a keg of sixpenny nails. Every man had a furnace to himself, and that meant a long row of them, and the nails cost us eight cents a pound. But somebody found out that a bit of steel wire run through a small machine and fed into a knuckle would enable a finished nail to be cut off at every turn, thus making six nails while you can count one. The machines do not cost over $500, and one boy can attend to six of them. The man who was making nails at six or eight cents a pound cannot compete with the maker of nails at one-fourth of a cent a pound. It is computed that $10,000,000 of capital was invested in old nail furnaces, and these have had to be thrown into the scrap iron pile, while a boy now works six modern nail making machines. And what is the lesson in this for us? Are we farmers working with old methods or with the new? We regret that we cannot get to the front, but it is not unlikely that our progress is slow because we are so loaded down with old methods and miserable baggage that we can hardly travel onward. Let us try if we cannot get five of these bovine machines to do the work of ten in the dairy.

And this brings us to the dairy cow. What does this animal do? I have just made a tour of northern New York, and I found that in that section the average cow was putting only about 3,600 pounds of milk a year into the creamery. It costs the dairyman about $36 to make that milk, so you will see that the profit is really on the wrong side. The cow must be trained to give more milk. She must not be like the little Jew who swallowed a five dollar gold piece, and all the doctors could get out of him with a stomach pump was three dollars and sixty-five cents. (Laughter). We must have a cow that will give her milk in a generous fashion in response to generous feeding. I believe that in a short time, by judicious selection and feeding, you can get cows to yield not 3,600 but twice that quantity, thus saving nearly half the feed. We must cull out all poor and unpromising animals and breed better ones. That means a good deal. It means also that the farmer will have to do his own milking and not get his wife to do it. (Laughter and applause). We must study more closely the individualism of the cow. It does not matter so much what is the breed of the cow; a good dairy is the result of the selection of the best and the rejection of the poorest milkers. We say that "Like begets like," and that if we have good cows we will have good calves. You say, "look at the

trotting horses." Well, how many of them can trot a mile in 2.20? Only a few horses can do that, and the rest are no good for anything. The point is, that breed as we will there must be close selection. The breed of cow that I am in favor of is the cow that will put plenty of rich milk into the pail. If your cows can do that, no matter what the breed, you have a select dairy. We must have cows adapted to do the work we require of them. What do we expect the cows to give us? And in answering this we have to put dairying into three divisions: Do I want to make butter? Do I wish to make cheese? Or do I desire to send my milk to the city? In the city of Cleveland alone 2,700 cans of milk, and eighty-five pounds of milk to the can, are daily taken in from the surrounding country. But in the majority of cases we need to concern ourselves chiefly with the cow adapted to the creamery or for home butter-making, or the animal best suited to the requirements of the cheese factory. Now a good butter cow is a good cheese cow, and a good cheese cow is a good butter cow. That may seem not to harmonize with the view of some of you. But just here the question arises: Shall I keep a cow that gives me 12,000 pounds of thin milk or one that yields 7,000 pounds of four and one-half per cent. milk, and not have the pleasure of milking tons of water extra in the year. (Laughter). It seems to me that the cow we want most of all is the one that will put four or five per cent. of solids into the milk, even if she does not make the milk pail look like a wash tub. (Laughter). Some say, "Why can't you give us a cross of good rich milkers with a large flow?" Did you ever see a good cross of a Percheron and a trotter? If a man prefers a Holstein cow let him keep her, but he should put her to the test for richness as well as for yield. If he milks Ayrshires, let him also put them to the test. If you have a Jersey dairy, put them to the test for both yield and richness. It is for you to judge whether it is best to select from your own herd or from that of your neighbors. With us the southern part of Ohio is a recruiting ground for those in the north, so far as dairy cattle are concerned, and we buy largely mature cows. The other day I picked out a cow in a drove and paid thirty dollars for her. In sixty days she gave me sixty times forty-five pounds of milk, which sold for just what she was worth. The farmer who sold this cow must have been asleep. When these fellows know what those cows are worth, then we will have to raise our own cows.

In successful dairying much depends upon the character of the food we give to cows. A few years ago anything that they would eat was fed to cows. What that food was composed of never troubled the owner of the animals. But students of agricultural chemistry say that foods are of two great classes, namely, carbohydrates and albuminous matter. The corn plant, which is full of starch, is of the former class, while most of the meals are of the latter, or the albuminoids. The carbohydrates furnish the fuel for the dairy machine, while the albuminoids make muscle and flesh. Every time you feed your dairy machine, therefore, you must remember that about four parts should go to provide fuel, and one part to repair the waste of flesh, muscle, etc. This, then, makes it an important question as to how we shall get that four parts of fuel as cheap as possible. In the summer time your cow eats in the pasture and gets her own fuel. "Ah, sir," says some one, "you are mistaken in the idea that a cow needs any fuel in the summer. It is all fol-de-rol." "Well, a dead cow is a pretty cold cow, isn't she?" (Laughter and applause.) We must study more particularly how to feed our cows in winter and in spring. We have late springs over in Ohio. Sometimes winter is not content to linger in the lap of spring, but wants to sit awhile in the lap of summer. But someone else asks me, "Why don't you feed your cow with hay?" Well, how much fuel do you get off an acre of hay? How many men got four tons of hay to the acre off their pasture? Not one. How many got three tons? Not one. How many two tons? Very few of you. Well you all cut a ton, because everyone of you told the assessor that you did. (Laughter.) And what do you get out of a ton of such fuel for your cow? If you take a ton of timothy hay and get all the water out of it, and strike out the fibre, which means so much dead material, you will find that the ton of hay has shrunk to less than 1,200 pounds of fuel to burn in our cow's furnace in order to get her warm. Is there any cheaper way of getting that fuel? If from off an acre of silage corn you can husk eighty baskets, besides getting 5,000 pounds of edible, succulent corn food matter, that means about 8,000, as against 1,200 pounds of hay. The hay will feed a cow for three

months, while the corn crop, if well saved, will keep her going for almost two years. You want to get this big fuel crop, and save it in the best possible way. If you believe you can save it best in the silo, I think you are right. If you think you can save it best in shooks, do so; it is better than not doing anything in the corn line. But what is usually done with corn? We throw the best part of the crop into the field, allowing the cattle to take what they like of it, littering the field, and hurting our religion, when, in the spring, we have to gather it up as refuse. (Laughter.) We throw a lot of corn away, simply because it is a little bother to preserve it. A little bother! My friends, is it not a little bother to take our grain to the mill, and have it ground into meal? Why, nothing useful and helpful and saving is done in this world without a little trouble. Now, if, instead of throwing that corn over into the field to the cows and wasting much of that valuable food, it is cut into one-half inch pieces, we not only save nearly all of it, but we save ourselves a lot of work in the end. It means also that we will realize within ten per cent. of that 8,000 pounds of food, or fuel, instead of wasting it; and that is much better than using 1,200 pounds of hay. Out our way we have our choice of using Palmyra or Salineville coal. In Palmyra coal we find about 125 or 150 pounds of cinders and ash, while in the Salineville coal we get fully 600 pounds of clinkers and ash. You would not expect me to pay as much for Salineville coal as for the Palmyra? And yet people do not think it worth while to examine into the quality or price of the fuel they provide their dairy machines with. In the past we have been buying nitrogen at a high figure, not knowing that we had plenty of nitrogen on our farms, or that we could easily place it there. Let us grow certain crops like peas, beans and clover, which are rich in nitrogen, and thus get into the soil this nitrogen which it so badly needs. We want more clover hay, and we can easily exchange our oats for mill feed, and thus we can get this one part to make blood and bone and sinew, giving us, with the four parts of fuel, a perfect feed. Cows want succulence in this fuel food, and as corn fodder is dry we want something else to put with it. I have been working for some time to get some good supplementary crop from October to November until we get our cows on their winter ration. We have tried meal and all kinds of food, until now, in the last week of August, we grow peas and oats, and we use it with advantage late in the fall as a supplementary crop. Peas and corn-stalks make a magnificent sustaining ration. Let us feed our machine with the proper fuel. Some persons will give a dairy cow four pounds extra of Indian meal, but such a ration as that has a tendency to put more fire into her system and dry her up. Instead of putting such heating fuel into a cow you need to give her a class of food that will build up her bone and muscle. The man who will succeed in dairying in the future is the man who will give his cow the food best calculated for milk production. Why do you want to load up a cow with food for her self-protection in winter, when it is cheaper, more humane and wiser to protect her with good boards lined with tarred paper, and having windows in that stable to let in the sunlight? Nature has got tired of our treatment of her, and for that reason it is harder to get from her what we used to in the way of the old time crops. She put her treasure on the top of the soil, and we went with our great baskets and took it off, but put back little or nothing in return. And now nature has locked up her treasure, so to speak. Before we went to the box wherein it was contained, and with a crank, key or nail we opened that box easily and robbed her of her treasure. Now she has fastened her wealth with a combination lock; it is once to the right, once to the left, to the right again, and the dropping of the bolt can be heard. Let us carefully study that combination. It appears to me that the three great readings in the dairy combination lock is a good cow, a good crop, and good care for both.

ADDRESS BY THE MINISTER OF AGRICULTURE.

Hon. JOHN DRYDEN, Minister of Agriculture for Ontario, was then introduced, and was received with enthusiam. He said: I desire at the very first to congratulate all present upon this magnificent meeting. As I look into the faces of those before me I can see that nearly all of you come from the farm. You have come to hear, and to be instructed

by the various speakers who are announced to address you. I never did believe very much in cheap literature, and I know that people generally do not appreciate it. I remember that when we went to the farmers' institutes a few years ago the officers would sometimes bring a few bulletins with them which they had saved up for a year or so, and say: "Here's something that I have brought; I don't know what it is for sure, but you can take it if you like." Now these bulletins were neither cheap nor worthless, but hardly anyone took them. Everyone seemed to accept the valuation thus given them. On the same principle I do not wish to intrude myself upon you, because my remarks must at best be of a general character and are only thrown in as an extra, my name not appearing on the programme at this stage. I know you will prefer to hear those who are here at considerable expense and will speak on specified subjects of great interest, while my remarks may be considered too cheap to carry away.

I am here to bring greetings from the Government of which I have the honor to be a representative. The Ontario Administration wishes you every success, and are delighted with the use you have made of the money granted to you in the years past, and which has been expended in such a way by you as to accomplish so much for the good of the country. You will not misunderstand me when I say that this Dairymen's Association is one of the great educational institutions of the Province. (Applause.) Any of you who have heard me speak on any former occasion know very well my views as to what education is. I believe in education. I believe in practical education. If I did not, I would not have consented to an increase of the grant to this Association as I have since I took office. I believe that these dairy associations are in the highest sense educative. I know that they are not going to teach these young men and women how to read and write and spell. But something will be taught them through this instrumentality that is of equal benefit and importance. I am delighted to observe that this large assemblage of intelligent farmers have gathered here willing to learn from the experience of others, and that is of itself a hopeful sign. One difficulty we have had to contend with in previous years was that too many farmers thought they knew it all and needed no instruction. It is encouraging therefore when you find progressive farmers declaring by their presence at such a gathering that they are open to learn things new about their calling, and have come here to receive instruction from John Gould and other practical teachers in agriculture. I know something of Mr. Gould, and can tell you that he has carved out his fortune bravely and wisely, and that he is sound through and through. Up at Woodstock yesterday, at the Western Dairymen's Association meeting, I met another man, Mr. Theodore Louis, a self-made man who has carved out his fortune in the great State of Wisconsin, much further west than Ohio. That grand old man is doing what he can now, with love in his heart, to help his fellow agriculturists by his own well-learned lessons of experience and observation.

One thing necessary to our success in farming is unity of action. I love to see farmers coming together for mutual counsel and help. I admit that I do do not think we have any particular necessity for a third political party, but I am willing to hail almost anything that will bring the farmers of this country nearer together. If a farmer comes here selfishly saying, "I am going to get all the good I can from this gathering; I will try and learn how to handle my milk better in order to make better butter and cheese, so as to do better than my neighbor and get ahead of him in that way"—that man is on the wrong track. You will be the gainer if you will help your neighbor to improve also. (Applause.) A lady who attended the travelling dairy once took me to task for teaching her neighbors to make as good butter as she did. I said, "You forget that the woman who is making poor butter is making just as many pounds as she will when it is a better quality, and when she sells the poorer quality and it goes to the home of the banker or merchant the children taste it and don't care to eat it, and the result is that it does them for days and days. Now, if we can teach her to make as good butter as you do the children will eat the purchase in a short time, and the mother will have to say, 'Why, children, you are eating too much of that butter.' And so many more pounds will be consumed—more than your neighbor can supply—and hence your market will be better, not worse." The dairymen have set an example to all the Province. They work together unitedly in forwarding this grand cheese industry. But it is not

enough to have *unity*. We must also have *purpose*. Just as soon as a man decides to make first-class cheese or butter he has a purpose before him. But before he comes to his work he must know how to carry his purpose into effect. In other words, the man must have an IDEAL before him. It is not enough for one to say, "I am going to commence dairying," and send someone without instruction to buy his cows. He must know what kind of cow he wants himself, or otherwise he will not succeed. You must have a proper ideal before you. Such gatherings as these help you to form a right ideal. If you like, you may put Mr. Gould or the dairy instructors under a cross examination, and in that way have your ideals tested and developed along proper lines. We must also work with determination. If you want me to show you a body of men with a determined purpose I will point to the farmers of Ontario. To-day we are working under disadvantages. We are beset with various difficulties, and ordinary men would often feel like quitting altogether. In, fact, sometimes men come to me and say, "I cannot stand this any longer." But some of these men have gone bravely and wisely again to their work and have succeeded. We must put British pluck into our business. Yet we cannot succeed without knowledge. Do not run away with the idea that you have it all in your head, for you have not. I have been farming for thirty years, and yet I expect to learn something valuable from every meeting I attend of a like nature to this. I am open to learn as long as I live. You cannot succeed in agriculture without the proper knowledge. The Legislature of the Province gives money to these various agricultural associations and other institutions in order that you may be provided with helpful information. But how often it grieves me to think that while this valuable information comes through the post office to almost every man's door, there are some farmers who say, "I don't want to read this stuff." They really do not want to learn. I am desirous that all this valuable information should be used to the best advantage. We have in Canada a great country. It is great in extent. It is great in resources. Its possibilities in agriculture have never yet been stated. Sometimes I have been laughed at for starting the Pioneer Dairy Farm away up in Algoma, where it is supposed fertile lands are not found, but twenty years from now you will be astonished to see the development of that splendid district. Not only are we great in extent, and great in resources, but we are also great in *men*. I doubt if our neighbor, Mr. Gould, can show as fine a lot of men and women at a similar gathering on his side of the line (Applause and laughter.) But if this country is ever to become what it ought to be it will be largely because the farmers have taken advantage of the educational facilities that we are striving to bring within their easy reach. Political upheavals will not make this country great. But Canada can be made great by the energy, industry and honesty of her people. And in this good and grand work your Association is doing a noble part. I urge you to go forward in your endeavor to advance the great industry you here represent, and so long as I occupy the position I now do I shall be willing, both in the House and out of it, to give you a helping hand. I wish to stir your enthusiasm in these depressing days, when farmers generally get so little return for their labor. We must cheapen production, and endeavor to make our farm products BETTER than ever before. There is a great future for this country. We are only on the fringe of our possibilities. Already we occupy the highest position in dairying of any country in the world. We must keep that position, and advance still further in the van. When you think you have lack of information on any point touching agricultural practice write to the men who are paid by the Government to deal with these questions. Fight this battle of intelligent industry with energy, and I have no fear of the result. Grasp each other's hands; what one knows the other should and will know, and this mutual aid will mean general prosperity. By thus coming together, and each assisting the other forward in the road to successful dairying, you will lay the foundation for a success in the future that will eclipse even the magnificent record of the past. (Applause.)

HOG RAISING.

Prof. J. W. ROBERTSON, Commissioner of Dairying and Agriculture for the Dominion, was introduced by the President saying that the Professor's name was known to every dairyman, and said: I have to speak upon what some may consider a most uninviting theme. I am asked to talk about raising hogs. I wish to see justice done to the animal. The hog deserves more credit than he generally receives. I consider him a good citizen. The politics in his dominion, as in our own, are sometimes of a disturbing nature (laughter), and for want of proper management he may not give a proper return for his keep. He cannot create; but he can change what he consumes into valuable product or waste it. He can take a lot of swill and turn it into luscious bacon. He can also turn the best of food, like the finest of wheat and corn, and meal and milk, into nothing but cussedness and squeal. The hog needs to have his education looked after. He has not been carefully educated if he does not show by his behaviour that he lives to do things for other people. And that is what's the trouble with many men. Just as soon as a man comes to the conclusion that the education of himself, and of his boys and his girls, is for the purpose of fitting them to aid in the promotion and production of that which is valuable and useful, to be directed in the way of helping others, just so soon does he put himself into proper relationship to his surroundings. I wish to point my despised hog to the nobler kind of behaviour to which he may attain.

I have not an expectation of telling you much in this connection that you cannot learn elsewhere. I do not think it well in a speech to try to pile too much information on an audience. If you take a seed of wheat or kernel of corn, and put it down into the dark soil, where it will remain buried or planted, it will stay there and rot unless the sunshine comes and thrills it with warmth and energy into vibration and life. The sun wakens that kernel of corn almost from death into life, for if the genial influence of the sun does not reach the dormant seed it will die. In this case the sun takes hold of the vitality of the seed and says: "Wake up; do something." Then the little seed begins to do something for itself in earnest, and to roll up power. It has wakened up. The mission of myself, and the other public servants here, is not only to tell you things but to help to wake you up for active growth. The main object of this and similar conventions is to stir people up to do better than before. And so, too, do I want to waken up my hog; and I do not want to do so by turning a dog on him. The hog can add very much to the wealth of the community. On some farms he has paid for the furniture and the books, and has made life pleasant for his owner. You will see by this table that he is of some importance from a trade standpoint:

Countries.	Cattle.	Sheep.	Swine.
	No.	No.	No.
The world	298,873,657	534,848,924	102,172,224
United Kingdom	11,207,554	31,774,824	3,278,000
Canada	4,060,662	2,513,977	1,706,785
Australia	12,632,018	116,153,632	1,026,014
United States	52,378,283	42 273,553	46,094,207

In a country like Canada, where we have less people than we can raise food for, it is a wise thing for the farmers to look around and ask, "Where can I sell my surplus products?" The one country in all the world which buys foods for its people is the United Kingdom, or as we generally call it, England. It is practically the only country which does not provide food enough for its inhabitants. France, Germany and Denmark, Australia, Italy, Spain, Portugal and the Argentine Republic are all competing with each other in supplying the markets of Great Britain. When you read of England being pitifully alone as in case of war it is all nonsense. There is hardly a nation of the earth that is not wearing a white cap as a waiter at the tables of Great Britain.

In looking over the provision bill of England for the year, 1894, as shown in the following table, you will see that she is a generous buyer :

IMPORTED BY GREAT BRITAIN.

Animals, living, for food	$ 44,237,455
Dressed meat	110,594,951
Butter	65,449,268
Margarine	14,818,075
Cheese	26,644,708
Lard	13,424,292
Milk	5,252,277

Oleomargarine is sailing under false colors, and is an undersirable thing to put upon the food market. Our export of cheese to Great Britain was 53 per cent. of what she took from all countries, while the home product of Great Britain is as eight pounds to five and a half pounds of what she imports from all countries. In 1895 the British home production was rather small, and that will likely put the cheese market for 1896 in a better condition for us. In 1894 the domestic production of Great Britain was the largest on record. We have been sending more than half the imports of cheese of England, and it has been a good thing for us. We ought to be able not only to retain or increase our lead in cheese, but also to send a good share of dressed meats, such as beef, mutton, bacon and hams. It is worth while considering whether you cannot turn your Indian corn fodder and ensilage into something else besides milk and cheese, even while you still make plenty of first-class cheese and butter.

A glance again at the first table given will be interesting. In the last seven years Australian cattle have increased by three and a half millions, while ours altogether are about four millions. There are about a hundred million hogs in the world. If we can get a better method of raising, feeding and finishing our hogs, and they are cured in a way acceptable to the British market, we can increase the number without lowering the price or the profit. Too many farmers raise their hogs to sell in October and November. Now, if we had a plan of selling our hogs in July, August and September we could keep up the price while increasing the number. But it is useless to attempt to increase the number of hogs unless you have some fixed and practical plan for feeding them. I do not think it is well for a man to keep more than one hog for each acre under cultivation —for instance, forty hogs on forty acres in addition to cattle and sheep. The hog is a capital scavenger, and will eat up much that would otherwise go to waste. Hogs will pick up waste matter here and there. Sometimes this cleaning up will mean $1 or $1.50 an acre, and this practically means the rent. Hogs can be increased very rapidly. One sow will give you eight young pigs in a year, even without two litters. And half of these might be saved for breeding. That will give you four sows to breed from. In ten years' time the family from that one sow would be several millions. You can easily arrange to have hogs for sale both summer and winter. Have as many as possible to dispose of in summer, and sell the rest when you can.

I now direct your attention to a table showing the imports of swine and their products into Great Britain during 1894 :

From	Swine	Pork.		Bacon and Ham.	Lard.
		Fresh.	Salt.		
	No.	cwt.	cwt.	cwt.	cwt.
Canada	.....	.....	7,702	305,019	18,604
United States	.....	4,339	150,186	3,636,473	1,304,638
Denmark	....	2,015	61,360	768,613	.....
Holland	.....	133,526	1,935	3,666	309
Other countries	8	40,503	3,836	85,617	2,855
Total	8	180,383	225,019	4,819,388	1,400,406

We see that Great Britain imports nearly five millions of hundredweights of bacon and ham, and but a very small share—about one-sixteenth of it—goes from Canada. In fact, three-fourths of the British imports of this class of meat goes from the United States, which sends twelve times as much bacon and ham to the Motherland as we do. During the past twenty years the Danes have accomplished much. They have striven to have their cows calve in October, and while they have not been altogether successful in this, by the use of skim-milk, available every month of the year, they have largely increased their exports of bacon.

A MEMBER: What breed of hog do you recommend?

Prof. ROBERTSON: Theodore Louis was asked that identical question, the other day, at Woodstock, and the old gentleman, after appearing to ruminate for a while, shrewdly said, "I would recommend the hog that will give you the largest return for the food you give it." (Laughter and applause.) A quality of mild, lean bacon is preferred. A few years ago, when there was a big demand for bacon in the lumber camps, a side of bacon that had a thick back of fat would fetch the most money. Now the people of England will pay the best price for a side of bacon where the fat does not exceed two inches or so in thickness. The old "razor-back" was made fun of in the past, and often undeservedly. If you can get a good cross between a broad-back and a shelving-back hog you will get pigs that will give you the best return if you raise them for bacon and ham Much depends upon the form and shape of an animal as to whether it is valuable or not as a bacon hog. The Tamworths, Yorkshires and Chester Whites have thinner backs and longer sides than the Suffolks and Berkshires. We get the best returns in quality and weight from crosses between the Berkshire and one of the first three breeds named, or grades of the same. If Berkshires are fed long they get a little too much lard on the back, and therefore a dash of blood of some thinner backed variety improves the breed from a bacon standpoint.

A man can make a hog gain more weight on the same food in June, July or August than he can in October, November or December. Therefore every pound of increase costs him less and adds to his profits. You see, it takes more food in winter to maintain the animal in the way of supporting the body. For two years we kept and experimented with Berkshires, Yorkshires, Tamworths, Essex and Poland Chinas. We had these breeds crossed in every possible way. These cross-bred pigs were given the same food, and there was no constant superiority of any particular breed or cross. None of these pure breds or cross-breds ate appreciably more than the others for the 100 pounds of increase in weight, except perhaps the Yorkshires. The Berkshire crosses gave us as good returns as any. But in sows, as in cows, there is far more difference between animals within the breed, than between the breeds as such for making profits. It pays a man to pay a double price for a sow that is long and lusty, and looks as if she could run a long distance without getting out of breath.

Shelter for swine is needed in cold weather. If there is one thing harder for a pig to endure than another it is a draught. I believe a pig can withstand still cold as well as any other of the domestic animals, but it cannot stand a draught. If a cold wind blows across a hog for two hours, I think the animal will be much the worse for it. It is almost sure to give it constipation, and that is one of the most dangerous ailments that afflict hogs. Give your swine a warm and dry sleeping place, with freedom from draughts. The hog needs exercise, which has the effect of making the body quiver with life. That is entirely different from leaving the body to shiver with cold. If the body of an animal is not exuberant with life, the animal will not take as much nourishment, or will not use it economically. The man who leads an active life, with due exercise, has three chances to one of living longer than a man of the opposite habits. But the pig must be given exercise wisely. The pig should not be allowed to have so much exercise as to waste the food given it; but I would have it so placed that it would be able to take enough exercise to develop strength and maintain health. A notion has got abroad that a breeding sow should be kept thin and half starved. That is a fallacy. There is no time in the life of a sow when she requires good food more than when she is carrying and nourishing her litter. We keep our breeding sows in a good condition of flesh, and we

have lost very few young pigs in five years. We keep them in yards where they can get plenty of exercise.

Sometimes a sow will eat her young. There are two reasons for this. It is either because she is very uncomfortable or because she is badly nourished. Perhaps she has not been given any ashes or earth to eat. In that case, if you will examine her tongue you will find that it is white, and looks as if she had dyspepsia. If a sow has dyspepsia from being badly fed she is cross and discontented, and will grab at anything to alleviate that feeling, and so she will bite and devour her young, and thus get a taste for blood. Throw the breeding sow an earthen sod a day. It will be an excellent tonic for her, and she will grow more contented and comfortable. There is also the instinct of motherhood. This is the most masterful instinct that we know of. If a sow can but hear her young squeal, she will face and chase a man with a pitchfork in defence of her offspring. A man comes into where the sow is lying with her new litter and tries to remove some of her young, when they begin to squeal. The mother will seize the man's hand, or a young pig or anything else in order, as doubtless she thinks, to preserve her family from injury. Let the sow get used to your appearance, to your clothes, to your voice, and if you are kind and helpful you can soon get where you like and do what you like without causing any trouble.

Wean the pigs in a sensible way. The common way is to allow the pigs to suckle with the mother until they are six weeks old, when they are suddenly weaned, and one or two little pigs are left to keep the sow's udder from sudden drying. This has a tendency to stunt the pigs taken away, and once stunted they cannot regain their proper growth. Get a little trough, and let the young pigs learn to eat with their mothers—eating and suckling, eating and suckling for several weeks—in this way they will never get stunted, nor will they get pot-bellied. It pays to give some skim-milk or butter-milk to young pigs until they grow to 150 pounds in weight, even if it is only a couple of pints a day.

In putting up premises for pigs, it pays to have the floors so arranged that the animals will not lie in the wet. If you have a feeding trough where the floor of the pen slants from the trough, the pigs will be wet; but if the floor slants towards the trough the water will run that way into the gutter, and the pigs will have a healthy, dry bed.

We have been conducting experiments as to the relative value of steamed and warmed feed and cold and raw feed. The pigs fed on steamed and warm grain have grown faster, but when we made up the cost, per pound of increase, there was no appreciable difference. In feeding ground grain and unground grain I found that the pigs consumed ten per cent. more of the unground grain, and ten per cent. will pay for the grinding, while the pigs fed on the ground grain will have stronger legs and better health, and will consequently do better. We feed all our meal soaked for an average period of thirty hours.

In feeding skim-milk to fattening hogs, it pays to feed a small quantity only per day. From four to five pounds per head per day is a more economical allowance than fifteen or twenty pounds.

In feeding whey, there are several things to be noticed. Whey is a very poor diet to feed alone to a hog, unless the animal weighs about 150 or 160 pounds. Whey may be turned to lard on a full-grown hog, but it should never be fed alone to young ones. The best thing to feed with whey is clover—either clover hay or clover pasture. The man who will feed clover will be surprised at the number of hogs he can fatten in the summer. Two acres of clover make a most valuable adjunct to a good supply of whey. If you pasture your hogs on clover, and use that field for a crop of Indian corn, you may count on five tons of corn per acre more than an ordinary crop.

My idea is not to advise you to become specialists in hog-breeding, but to suggest some things to enable you to make the most of your general crops, to make the most of your clover, of your corn, of your whey and of your skim-milk.

Feed your whey as clean and sweet as possible. Regardless of the flavor of the cheese altogether, every cheese factory manager should insist upon the maker carefully

cleaning the whey tank once a week for the sake of the hogs. (Applause.) It means wholesomeness. The whey tank should be above ground. The whey might be lifted either by a pump or an ejector. The cheese-maker would thus give his patrons more value in the whey, he would protect himself against bad flavor in his cheese, and he would also keep his factory so sweet and nice that the whole business would be lifted into a higher plane. It is a poor thing for a maker to give advice to his patrons about keeping their milk cans clean when you can smell his factory two miles off. (Laughter and applause.) Theodore Louis said that he found it profitable to give a condiment to his hogs. He recommended four pounds of charcoal made from corn cobs, six pounds of salt, one bushel of wood ashes, thoroughly mixed, and one and a quarter pounds of copperas, dissolved in water, and sprinkled on the mixture as an excellent condiment. He puts the mixture in a self-feeder and allows the hogs to take all they want.

A MEMBER: What about coal ashes?

Prof. ROBERTSON: I would give coal ashes if there was a large portion of charcoal in them. Give the hog a fair chance and he will become a valuable citizen; he will do better with what he is fed, and make you all the richer and happier for it. I have a high opinion of the hog as a leading factor in the agriculture of this fair Province of Ontario. I have been trying to develop the faculty of humor in pigs. Why does a man take offence when he is likened to a hog? A man once told me it was because "It sounded as if a fellow ate too much." But I have never seen a pig eat too much. He may leave some in the trough and waste it. A cow or a horse will eat too much if they get a chance, and perhaps die. But a pig, though it likes to eat, will quit before it injures itself. A pig, however, has no sense of humor, and, therefore, a man likened to a pig, feels that he is regarded as a dull fellow. I find that certain foods will affect the disposition of the hog. I have fed them with food that made but little bone, and it appeared to make them quarrel and nag as if nervous, just like human beings. The pigs seemed unable to look on the funny side of anything, and nagged and grumbled all the time. The sense of humor is the last faculty a man gets, and a pig does not seem to be able to fully acquire it. Where pigs are well fed they may quarrel in a sort of way, but it is more or less good-natured. Feed the hog well, and he will grow more meat as he grows more humor, and is more cheerful and contented. As with the hog, so with the man. If you find a farmer in this part of Ontario using himself so that he makes the most of himself—of his crops, of his cows, of his hogs, of his time, of his body, of his mind—he becomes a man of power, a man of helpfulness. The farmer who will care prudently for his cattle and his hogs will be a successful and contented man. And a land in which the farmers are prosperous and contented is a land worth living in. (Applause.)

The meeting then adjourned, to meet at eight o'clock.

SECOND DAY—EVENING SESSION.

When the chairman, Mr. C. L. OWEN, rose to call the meeting to order, it was impossible for some of those who came to the Music Hall to find standing room.

Mr. OWEN briefly expressed his satisfaction at the splendid attendance, and introduced the first speaker of the evening.

GROWING CORN FOR THE SILO.

Mr. JOHN GOULD, of Ohio, delivered a practical address upon the subject of corn growing for the silo, and was listened to with much interest. A report of this address will be found in the report of the proceedings of the Western Dairymen's Association.

BREAD AND MILK AND BREAD AND BUTTER.

Prof. ROBERTSON, bearing in his hands a loaf of bread, a glass of milk and a bunch of wheat, came forward to deliver the next speech, and was heartily received. He said: I am not going to speak to the farmer as such to-night, but rather to those of the audience who are consumers of the articles that I am expected to talk about. I once heard of a clergyman who was asked "to say grace." There was considerable noise at the table, and the host shouted to the minister, "Mr. Broadcloth, will you please say grace?" "I have said it," said the minister. "Well, I didn't hear you," said the other. "But I was not speaking to you," was the quiet reply. (Laughter.) And so to-night I am not to address you as farmers. I was to talk at another gathering upon "Bread and Butter," and when I sat down to frame some thoughts on that subject, I remembered the old saying that if a boy lets a piece of bread and butter fall it will fall with the buttered side down. The old adage says it does; but it does not. A boy remembers the worst experiences, but forgets the thousands of escapes in the recollections of some one misfortune. Like the old folks, he engraves the tale of his little calamities on tablets like brass, and writes the story of his successes and blessings on water.

I hope to treat this subject to-night in a suggestive way, which will cause you to ask and answer questions for yourselves in practical living hereafter. The kind and quality of the food which is consumed is closely identified with, if not the actual cause of progress or deterioration among a people.

The experimental farms in all branches of their work are maintained mainly to help to bring about the most abundant production of the best food in the world. Sometimes investigations to give information cease at the most important point of all. After conducting careful experiments to discover the most economical methods for supplying plant food in the soil for the sustenance of abundant crops, after testing the effects of the different functions of these crops in rations for live stock, shall it be left to chance and ignorance to determine how the food materials which are produced for the support of the people are to be used by them? Sir Henry Thompson, a noted English physician and authority on the effect of diet, says: "I have come to the conclusion that more than one-half of the disease which embitters the middle and later years of life is due to avoidable errors in diet; and that more mischief in the form of actual disease, of impaired vigor and of shortened life accrues to civilized man in England and throughout Central Europe, from erroneous habits of eating than from the habitual use of alcoholic drink, considerable as I know that evil to be." If a boy be nourished in an unwholesome way in early life during the period when his body is growing, he will be in a far-reaching sense "damaged goods" ever afterwards.

I take "Bread and Butter" to include all the material comforts which one earns through personal effort; and we all know this to be a good bread and butter country. As I said a moment ago, bread and butter has much to do with the progress of a nation. It effects that through the bodies of the people, through the material possessions of the people and through the intellectual and moral power of the people. Before I pass on may I enquire what progress, if any, are we making as a people? We boast of making many changes, but change is not always an evidence of progress. When butter changes, it becomes bad and goes from bad to worse. We have cut down trees, cleared hundreds of miles of land and made the face of the country hideously ugly in many parts where nature had left it gorgeously beautiful with its forest raiment. In many parts our country is not so beautiful to look at as it once was; and I do not think we are making progress wisely by the cutting down of trees for the clearing of land, unless we are prepared to put more serviceable plants in their places. Too much of our land has been cleared for the area which is tilled with intelligence, to produce bread and butter, or, in other words, to find food for the people.

We boast of the enlargement in size and increase in value of our possessions. We occupy more land; we do more labor in primitive agriculture, such as Indian "Ryots," Russian "Moujiks," and Hungarian peasants can do as well as we. That class of agriculture causes us to be spread out so far, that we are apt to become rather thin as a people.

Then, some people measure our progress by looking into the statistics of blue books, to see how many there are of us. If increase in numbers be a fair way of measuring a country's progress, China is the most progressive country in the world. So far as I know, it has a larger increase of population annually and less emigration than any other land the sun shines on ; that is not necessarily progress, or evidence of progress. It is not "How many are there of you?" but "What are you each good for?" Since these are not fair means of measuring any advancement we may make, what rule shall we apply to a country to determine its progress? How shall we measure it to discover whether it be a land good to live in, and whether it becomes more so from year to year? Let us estimate it by its bread and butter opportunities. There are few people in Canada who live in it, except by choice; so there must be something here more pleasant to the people than can be found elsewhere, to induce them to stay. What is that? I take it mainly to be a chance of making a good living and getting good bread and butter, and abundance of them. I mean by bread and butter all the material things which we want. That is how most of us have measured the land, or we would not be here; we would go elsewhere. Someone says that is a very low standard by which to measure a country's attractions and opportunities. It may not express a very high or noble ideal, but is it not the rule for every-day life, which actuates most people at the present time? I would rather be responsible for the statement than responsible for the standard of measurement. I have no sympathy with the flippant complaint of a few literary, so-called learned people, who say we are going over to an all-surrounding, and all-absorbing materialism. I find many men who are engrossed deeply in advancing the material interests of a country, who, by that means, are reaching up towards an attainment of their ideal of an honest and noble living; and I find others of the super-ultra literary sort, who are reaching out towards material and sordid ends through what are called ideal means. Would not an honest man, with a high ideal of life, rather dig drains, shovel coal, saw wood, break stones, and certainly rather bake bread, make butter and enjoy the luxury of realizing his high ideal of an honest living, giving the world more value in service than he got or took of substance, than follow a genteel calling for the sake of escaping toil and thus become a parasite, getting more than he gave. To be engaged in advancing the material welfare of a country is not sordid, but sublime.

Health, strength and personal efficiency for living are intimately connected with and dependent upon the kind and quality of the food we eat, and the proper nourishment of the body governs the exercise of all the faculties into right directions.

I hold in my hand some bread and milk. What is bread? You can weigh it and measure it. You can feel it and taste it. But where did it come from? A scientist might call this bread "manna." I call it something gotten out of the heavens, out of the unseen, for ninety-eight pounds out of every one hundred came originally from the atmosphere and not from the soil. As Mr. Gould said in his address a little while ago, it is atmosphere and sunshine rolled up together.

In saying a few words about wheat, it is well to know that little things, insignificant in themselves, sustain the life of the world's civilization. It takes between 20,000 and 25,000 grains of wheat to make a two-pound loaf of bread. Grains of wheat may not be much singly, but collectively they are the bread of the nation. 3,500 grains of wheat are swallowed when a boy disposes of his bowl of bread and milk. Wheat may make good flour and good bread and good food, yet if the grains were planted they might not grow. When wheat is four or five years old it is not likely to grow. The story of grains of wheat being held in the hand of an Egyptian mummy for thousands of years and then growing is all legendary Some seeds which have oily skins may retain their reproductive powers for years, but it is not so in the case of wheat. Wheat grains with vitality are more than substance, they are latent life, suspended animation. The vibration of the sun's rays are so inconceivably rapid that they cannot be understood. But what a gentle yet effective power they possess! I might say to a wheat grain, "Wake up," and I might crush it in the effort to make it obey. But the sunshine says in the sweetest yet strongest way, "Wake up!" and the wheat wakes up and lives—does something. That is sunshine

gentle. Sunshine boisterous is a house on fire. As long as a grain of wheat remains in the granary, perfectly contented, eminently respectable and undisturbed, it enjoys no romance; but as soon as you put it on a field and harrow it, and let the damp soil hold it, and the sun's vibrations thrill it through and through, it feels the aspiration of romance and lives. And so it is with boys who are sent out into the world. I would have a boy believe that everything in the world is possible to him. I do not like a lad whether he be sixteen or sixty, to think that there is no romance in life, no unselfish nobility of life possible for him; for just as soon as he believes that he becomes a selfish and therefore brutish man. But if he steps into the grave of unselfish renunciation for service he may have the romance of growing up into a beautiful useful life like a wheat plant. We do not like dirty jobs, especially if they soil our hands. You may say, "Oh, it is so nice to have soft hands, and wear a white shirt and nice clothes all the time." There is a notion that life is meaner and rougher for having the palms of the hands tough and callous and the backs of them brown. The notion is utterly false. A hard-working boy who soils his hands by honest toil and then washes them, has more to recommend them and him than the lily handed fellow who soils his hands by accepting money for which he practically gives nothing in return. Every part of the wheat plant is useful for the next crop, and failing that for something that is between itself and a higher form of life. There are straw and chaff to provide food for the cow, and thus to enable the boy to get milk for his bread. Man eats the fine part of the plant direct, and the cow or sheep eats the coarse part to elaborate it into finer forms. The sun winds energy into the plant as I wind energy into my watch. The sun rolls its energy into the leaves, and the stalks hold its strength. These are taken by the cow, and they carry the sunshine which has been rolled into them into the cow, the sun lets go inside and warms the cow. The warmth is the sunshine stored up in plants and afterwards liberated. The wheat plant is saying to us, "Go into the sunshine business, it may be that you have capacity and power for giving back sunshine to the world, more helpful and comforting and more easily transferable than I have in my stalk." Bread and butter are sunshine materialized; when eaten it should become sunshine humanized that it may be a blessing to the world; and if the playing out of sunshine into life does not pay you always in cash it will pay you in the richer currency of happiness. One hundred pounds of flour will make 136 pounds of bread; and since bread is such an important factor in the happiness and health of the people, instead of a girl being required to play sixteen pieces on the piano before being engaged, she ought to be able to make good, wholesome, dainty bread before any man should be allowed to seek her in marriage. (Laughter and applause.) Sometimes the bread appears to weigh about two tons after you have eaten it.

Nobody can create anything. The cow can change the form of hay or wheat into milk. The cow can improve or degrade food. Milk contains nearly every material of which we are made, and thus the milk is an almost perfect food. If I put sugar into milk it disappears, it is then in solution. If I put in pepper, however, it stays in its own form, and is in suspension. In the milk there are fat globules which are in suspension. They are so small that they can hardly be seen, but when milk is set they come to the top and form the cream. In a drop of milk there are millions of these fat globules, and these are the things from which butter is made. The more we are able to recover these the more butter we shall be able to make from milk.

The following chart shows the composition of the human body of average weight one hundred and forty-eight pounds:

	Pounds.	Percentages.
Water	90.0	60.9
Albuminoids	26.6	17.8
Fats	23.0	15.5
Carbohydrates	.1	.1
Mineral matter	8.3	5.7
	148.0	100.0

Water is the vehicle used oftenest by nature for the carrying of portions of material from one place to another. The albuminoids, sometimes called "protein," "proteoids," or

"nitrogenous compounds," are those which contain about sixteen per cent. of nitrogen. They get the name "albuminoids" from a typical albuminoid, well known to us as albumen, the main constituent in the white of eggs. Albumen is also a constituent of milk. The albuminoids of foods are the "flesh-formers," and, while they may be consumed to produce heat in the body, their main function is to nourish and repair the muscles, nerves, skin and other parts of the body which contain nitrogen. A living body needs these compounds to form the muscles, nerves, skin and other parts of the body. In performing the functions of life some portions of albuminoids are worn out from the skin, the muscles and nerves, and are carried off in the sewerage system of the body. We must swallow something to replace what is worn off, else we shall wear out. Therefore we must take in our food a sufficient quantity of albuminoids to maintain the albumoids of the body undiminished.

Then, in the human body are fats for heating and for lubrication. While the living body is composed of certain compounds, every living organism must consume fuel to maintain the warmth or heat.

COMPOSITION OF NUTRIENTS, IN PERCENTAGES.

——	Nitrogen.	Carbon.	Oxygen.	Hydrogen.
Albuminoids	16.0	53.0	24.0	7.0
Fats	none	76.5	11.5	12.0
Carbohydrates { starch	none	44.4	49.9	5.7
Carbohydrates { sugar	none	42.0	51.0	7.0

The albuminoids, fats and carbohydrates come from four elements or sources. Albuminoids only of the three contain nitrogen. Four-fifths of the atmosphere everywhere may be termed nitrogen. The albuminoids contain sixteen per cent. of it, and if we can grow any sort of a plant that will glean it from the atmosphere and make it palatable to cows or other live stock, then we may use the nitrogen from the atmosphere, through the plant first, and the cow or other domestic animal afterwards, for the use of man.

There is almost always such an abundance of mineral matter in the common foods which are consumed, that I may pass over it without further remark.

The uses of food may be stated as :

1. To form the fluids and tissues of the body.
2. To repair waste.
3. To be consumed as fuel.
4. To be stored in the body for future consumption.

The sources of all nutrients, or nourishing ingredients in food are depicted on the following chart :

Sun, Air, Water, Soil } Plant food { Drainage, Cultivation } Seeds, Plants, Animals, { Food, service } Man.

In fact, the production of food and the whole range of agricultural operations are but the conversion of some natural force from one form into another.

The following chart shows the quantities of nutrients which may be obtained per acre :

QUANTITIES OF NUTRIENTS PER ACRE.

——	Albuminoids.	Carbohydrates.	Fats.
	lbs.	lbs.	lbs.
Indian corn (9,000 pounds dry matter)	873	7,371	288
Horse beans (twelve tons, green)	653	1,814	167
Sunflower heads (seven and a half tons)	352	2,373	729
Hay (mixed, two tons)	271	2,888	97
Roots (carrots or mangels, twenty tons)	480	4,320	68

One object sought to be gained by the feeding of cattle is the elaboration of these crude nutrients into finer forms of food fit for human use. An intelligent man buys milch cows and feeds them cornstalks ; the cow eats cornstalks, and he is able to drink cream. The soil, the plants and the animals are all instruments of conversion ; and the objective is an abundance of food and service for mankind.

After providing food for the domestic animals required to elaborate coarse fodders into finer forms, the crops from five acres under a high class of cultivation might sustain five persons in abundance of good food.

The following chart shows the composition of some common foods :

COMPOSITION OF SOME COMMON FOODS, IN PERCENTAGES.

——	Water.	Albuminoids.	Carbohydrates.	Fat.	Ash.
Oatmeal	10.0	15.0	69.0	5.0	1.0
Rice	12.4	7.4	79.4	.4	.4
Pease	15.0	22.9	57.8	1.8	2.5
Beans	15.1	25.5	55.0	1.6	2.8
Pork, fat	10.0	3.0	.....	80.5	6.5
Potatoes	75.5	2.0	21.3	.2	1.0
Beef, rather lean	66.7	23.0	.....	9.0	1.3
Milk	87.0	3.5	5.1	3.7	.7
Wheat bread	32.7	8.9	55.5	1.9	1.0
Butter	12.0	1.0	.5	83.5	3.0
Cheese	35.0	25.8	2.3	34.0	3.7

Of the nature and function of albuminoids I have already spoken. They are known as "flesh-formers" in foods. The carbohydrates and fats of food are termed the "heat-producers." They are the starch, sugar, gums and fibre which are obtained in vegetables, cereals, fruits, etc., and the fat which we obtain in the form of the fat of meat, the butter-fat of milk, or the oils from cereals or other plant sources.

The term "nutritive ratio" is the one used to denote the proportion of albuminoids or flesh-formers in food to the sum of the other nutrients in the food. The heat-producing or fuel value of fat in food is two and a quarter times as great as that of carbohydrates, such as starch and sugar, and also two and a quarter times greater than albuminoids.

That the "flesh-forming" and "heat-producing" parts of our food should be in correct proportion to each other, is important for the health and well-being of the race. In the food of the well-nourished peoples of Europe the proportion is about one of the "flesh-forming" to four or six of the "heat-producing" constituents. In the diet of Americans the ratio is usually from one to six and a half, or from one to eight or nine. If you compare rice with oatmeal you will find that the difference between these has meant a great deal for the race. If a person uses a well-balanced ration, then, barring accident or disease, he will be a well-conditioned, effective individual.

In our experimental work in the feeding of animals, we find that the vigor, healthfulness and apparent contentment of the animals, as well as their profit-yielding capacity, are in a large measure determined by the proportions which these two classes of nutrients bear to each other, as well as to the palatibility and digestibility of the food which is consumed. I think that the same principle might correctly and beneficially be applied for the guidance of people in purchasing and preparing food for themselves.

The proportion of waste in some foods is very great. In beef the inedible or waste portion from bones is from ten to twelve per cent.; in mutton, eighteen per cent.; in eggs, from shell, 14 per cent.; and in chicken, from forty per cent. upwards. Three and a half pounds of potatoes have nourishing material equal to one pound of rice; and there are about equal quantities of nutritive material in one quart of milk, in three-quarters of a pound of beef, and in five ounces of wheat flour or oatmeal. The nourishing value of these three quantities may not be quite equal, as the body is sustained by what is digested, and not by what is swallowed; but, since a quart of milk (costing five cents), three quarters of a pound of beef (costing ten cents), and five ounces of flour or oatmeal (costing about one cent), contain nearly equal quantities of nutrients, there may be a great deal still to learn on the economical use of foods and the preparation of them in such a way as to make them both palatable and digestible in the largest measure.

I have put on a chart, illustrations by lines of different lengths the food value of twenty-five cents' worth of several common foods. The black lines represent calories, indicating the force value or the fuel value of the food. A calorie is a unit designating the amount of heat which would raise the temperature of a pound of water four degrees Fahr. The number of calories which a man needs to sustaim him at hard labor is about 3,500 per day. In twenty-five cents' worth of beef at fifteen cents per pound the food value is equal to 1,620 calories. The food value of one dozen eggs at fifteen cents per dozen is 1,860 calories. The food value of five quarts of milk at five cents a quart is 4,062 calories. The food value of twenty-five cents' worth of cheese at fifteen cents a pound is 3,455 calories, so that a pound of cheese is the equivalent of about two and one-fourth pounds of the best beef you can buy for food purposes. That is why the Englishman's diet of bread and cheese gives him a well-balanced ration at the very lowest cost. That is the reason, you see why, although the cheese market may temporarily pay a low price for it, a large output of cheese is a safe thing in coming years, because it is a cheap food compared with other foods. Men who have to study economy in buying, buy the foods which they like best and which at the same time contain the largest quantity of nutrient for the price paid for them.

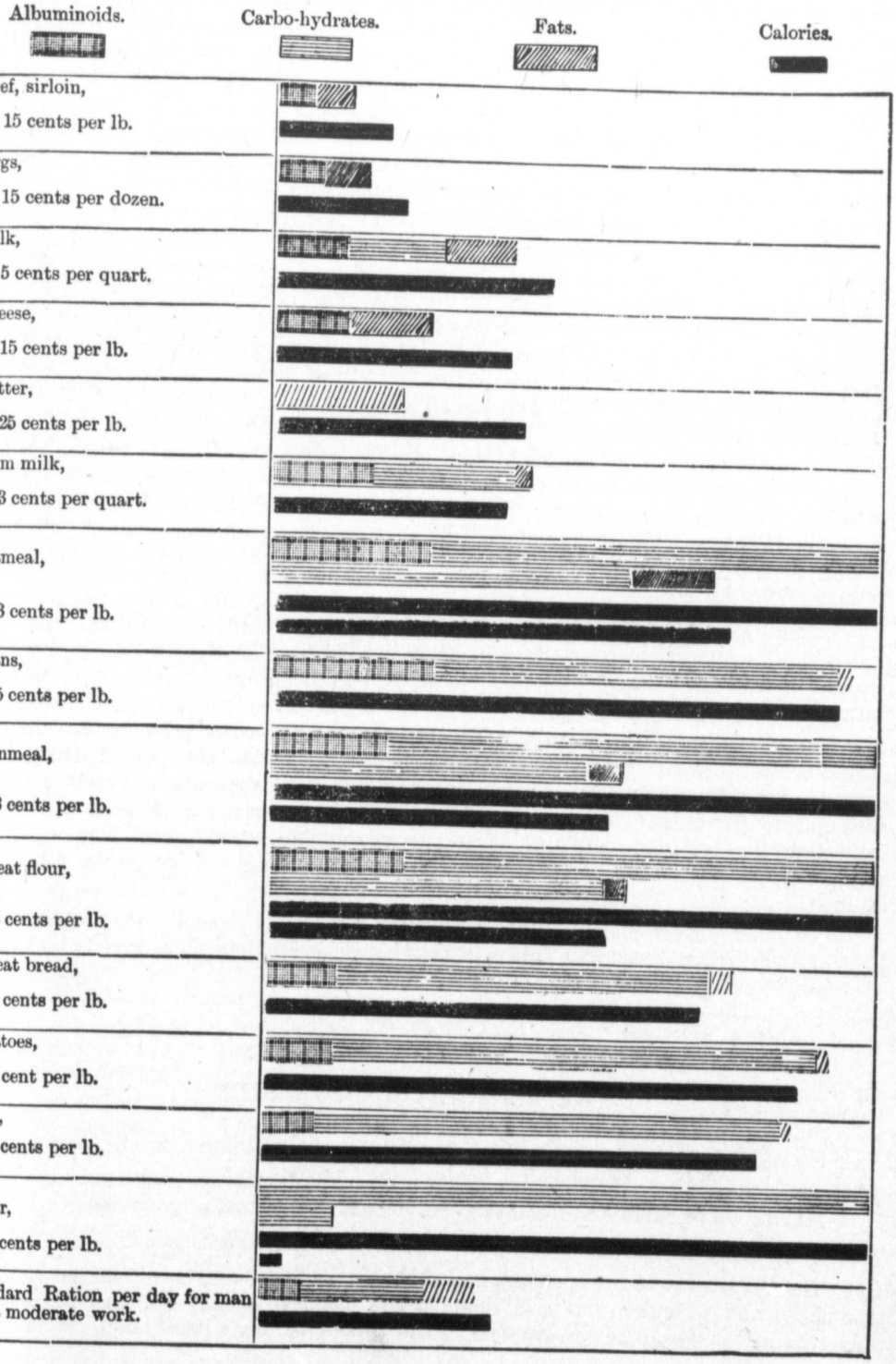
TABLE I.*

Nutritive ingredients contained in twenty-five cents' worth	Albuminoids.	Carbohydrates.	Fat.	Calories.
	lbs.	lbs.	lbs.	
Beef, sirloin, 15 cents per lb	.25	.....	.27	1,620
Eggs, 15 cents per dozen	.34	.....	.29	1,860
Milk, 5 cents per quart	.45	.58	.50	4,062
Cheese, 15 cents per lb	.47	.03	.59	3,455
Butter, 25 cents per lb	.01	.....	.85	3,615
Skim-milk, 3 cents per quart	.72	1.00	.07	3,495
Oatmeal, 3 cents per lb	1.22	5.70	.59	15,370
Beans, 5 cents per lb	1.16	2.96	.10	8,075
Cornmeal, 3 cents per lb	.77	5.88	.32	13,705
Wheat flour, 3 cents per lb	.91	6.24	.09	13,705
Wheat bread, 5 cents per lb	.44	2.82	08	6,400
Potatoes, 1 cent per lb	.45	3.80	.02	8,000
Rice, 6 cents per lb	.31	3.31	.02	6,795
Sugar, 5 cents per lb	.....	4.89	.....	9,100
Standard ration per day for man at moderate work	.28	.90	.30	3,455

*For some of the information in Tables I. and II., I am indebted to Farmers' Bulletin No. 23, by W. O. Atwater, Ph.D., issued by the United States Department of Agriculture, Washington, D.C.

TABLE II.

NUTRITIVE Ingredients contained in twenty-five cents' worth.



I have observed the diets of some of the people of Canada, who cannot afford to buy extravagantly or carelessly, and I find that one can buy for twenty-five cents considerably more of nourishing food than many of these poor people who do not knew anything about the nutritive value of foods buy for one dollar. In England the skilled laborer who earns $500 per year pays about fifty-one per cent. of his earnings for food. In Germany a similar artisan or laborer pays fifty-five per cent. of his earnings for food, and in Massachusetts men in similar stations in life pay out sixty-three per cent. of their earnings for food.

Woman is and always has been esentially the nourisher of the race. When, through her skill or efforts, the community is well fed, even to its poorer members, it is thus made strong to stand all the strain of our modern life upon it.

Amid the clamor of the new-fangled call for new chances for the New Woman one can still hear the unspoken cry of half-nourished bodies asking for better equipment on the part of the women in the discharge of the duty laid upon them in our form of civilization. This is a much harder class of work to do than those occupations which are termed fashionable and genteel; but, because it is hard to do, it is best worth doing well. It is as much harder to do, as it is harder and nobler to serve well than to shine well; and while the claims of social life, intellectual activities, financial management, domestic duties and artistic tastes become increasingly great, it is unpardonable that the hand of the nourisher of the people should become careless at that task. When boys and girls are grown in well-nourished bodies, the highest possibility will be realized in passing the torch of life on from generation to generation with a clearer, more kindly, unselfish light and life, exalted a little every time by the hallowed nobility of self-sacrifice and intelligent service. "Whosoever will be great shall be your servant, and whosoever of you will be chiefest shall be servant of all." That is how those silent, strong and constant forces can be made to act for good and not for ill.

In the light of history the advancement of nations is often in inverse ratio to the possession of adventitious resources, and while in Canada there is a very great increase in material wealth and in the availability of means for acquiring it, there is more danger of temptation to let go the ideals of useful nationality.

Under conditions like ours, it is still true that most men and women must labor and should labor. The rich man is no more absolved by his wealth from personal activity and effort than is the poor man by his lack of material embarassments. Wealth stands for accumulated power, and hence a wealthy man with personal endowment, who also can control wealth, is under double obligation to accomplish more in life than a poor man who is responsible for his personal power alone. Simplicity of life makes for nobility in life.

Let us have more plain and wholesome diet for the boys and girls of Canada, and depend upon it that bread and milk will lead not only towards more perfect health, but also toward more beautiful living and more earnest and effective labor. (Applause.)

THE ASSOCIATION THANKED.

Mr. C. L. Owen, of Campbellford, moved a vote of thanks to the Association for selecting the village as the place for holding the Convention.

Mr. Smith seconded the resolution, which was enthusiastically carried.

The President thanked the citizens for their splendid reception.

The Secretary also responded, and spoke in the highest terms of the public spirit of the mover and seconder, and also thanked the business people who had so generously advertised in the pamphlet programme. The village had done itself much credit.

A UNITED PEOPLE.

Hon. JOHN DRYDEN was then called upon and said: The presence of so great an audience as I see before me to-night would in itself be a strong temptation to undertake to make a speech, but notwithstanding this, I shall resist it and not detain you for more than a few moments, as it is now past the hour fixed for the banquet which has already been announced, and I know well that most men do not like to be kept too long from such a feast as is now in anticipation. I must, however, take time to congratulate the citizens of Campbellford upon their willingness, as indicated by their presence here to-night, to give their hearty sympathy to the men and women who are particularly interested in this Association, and whose homes are scattered all over this beautiful country. They are living in comparative isolation from their fellows, and are toiling day by day in the summer's sun and during winter's hoary frost. They are one of the wealth-producing classes of this country and well deserve the earnest sympathy of those living in the villages and towns.

Something has been said already of the unity of our people. I want to emphasize that point, because I do not believe anybody should be allowed to make an effort to separate our people into different classes. While a farmer myself and willing to assert the rights of farmers at all times, yet I am obliged to admit that sometimes I need the physician and sometimes the lawyer, although I do not care to be obliged to use them often. We must also have the blacksmith, the merchant and the tailor, and under such circumstances it is manifest that it is not the best thing for us to separate into classes, or for me to say that because you belong to one calling and I to another, therefore our interests must be opposed to one another, and that we must therefore remain without a common purpose.

The two gentlemen who represented Campbellford on the platform this evening have expressed their pride at being permitted to do something for their own town. I am glad to see them loyal to Campbellford, but such a spirit is too great for any one locality, and I wish to remind them that when they are working thus loyally to build up their own town, they are doing something to build up their own county, their own Province, and the whole Dominion. What I am seeking to do as head of my Department is intended not for one section but for the whole Province and consequently for the whole Dominion. I am a Canadian and therefore do not believe in sectionalism in any class. (Applause). Let me say to my friends, the townspeople of Campbellford, that occasionally you will find one of your farmer friends come to town without wearing his best clothes. Perhaps he will have on a straw hat which you do not think is quite the proper kind to wear upon your streets. May I suggest that you need not cross the street to avoid him on that account. Will you not give him your hand and speak some encouraging word, because underneath this rough clothing there is beating a heart as brave, as strong, as loyal and true as you will find in anyone who walks your streets under the most polished exterior. I have very vivid recollections of an incident that occurred in my own life illustrative of what I now say. A clergyman called at the house about noon, when I had just returned from my work on the farm. The door bell rang, and I went to let him in. For a moment or two he looked at me, looking at my boots, then at my face and then at my dress generally, and after a time he mustered sufficient courage to venture to say, "Well, you don't look much like a member of Parliament." It was not so much what he said that hurt me as how he looked. His looks seemed to say, "That is not the proper dress for a man in your position to wear." I confess to you I did not appreciate it, and why? Simply because I have a strong objection to being judged by the boots I wear. You may judge me for what I am, for what I have done, but do not judge me merely by the clothes I happen at the time to have on, and especially when they are in exact accord with the work I have in hand. Do not then despise these men and women who are doing the rough work in the country. You good people who live in the towns would starve if they did not perform this work. In the name of the farmers of the Province, I extend to the representatives of the town present at the meeting the hand of fellowship. May I say to you that what the country needs is that all her sons, of whatever class, calling or creed, should join hand in hand and heart to heart, having one hope and one ambition to make this our country one of the best of the nations of the world. (Great applause).

THE BANQUET.

The banquet tendered the members of the Association by the citizens of Campbellford was largely attended. The spread was a creditable one. Toasts, speeches and songs were continued until a late hour.

THIRD DAY—MORNING SESSION.

The meeting was called to order at ten o'clock. There was an unusually large attendance for a morning session.

ELECTION OF OFFICERS.

The report of the Nominating Committee was presented by Mr. James Whitton, and was unanimously adopted. The names of the officers elected will be found on page 2.

The PRESIDENT: I must congratulate the Association upon the selection of these officers. They are not strangers to the dairymen of Eastern Ontario. They have served the Association faithfully in the past, and I believe will do even better in the future. I am delighted that you have expressed your confidence in them by the unanimous adoption of the report.

INSECT PESTS.

Mr. FLETCHER then gave a long and instructive address on insect pests, which was listened to with marked attention. The report of a similar address will be found in the proceedings of the Creameries' Association.

POTATO ROT.

In reply to a question Mr. FLETCHER stated that the disease of the potato known as Potato Rot, which caused so much loss to growers of this tuber all over the world, was due to a parasitic fungus known by the name of *Phytophthora infestans*. The life history of this enemy is as follows: The fungus passes the winter inside the tuber and is actually planted with it by the farmer in spring. As soon as the potato begins to grow the parasite also grows with it, and sends up its vegetative system through the tissues of the stems and leaves of its host. About the end of July a mildewy appearance may be seen beneath the leaves. This is really the first formation of the spores, minute bodies analogous with seeds of higher plants. The mildew is the chief source of infestation, for on it are borne enormous numbers of spores which are blown by the wind to adjacent plants upon which they form rust. The rust of potatoes is merely one manifestation produced in summer of the same disease which later in the year causes the rot on the tubers. When a spore is blown onto a potato leaf it causes, first of all, rust which means a diseased spot where a great many more spores are produced, so that one diseased plant in a field may be the cause under favorable conditions of the loss of a whole crop, for the same spores, as stated, when blown or washed onto the foliage produce rust which, if they had fallen to the ground and been washed by the rains down to where the young forming potatoes were, would cause the rot. Potato rot, it was explained, is a distinct disease due to a distinct kind of germs and could not exist unless those germs were first brought into contact with the potato plant. The reason that potato rot was thought to be due to damp weather or to low land was owing to the fact that in such cases the conditions favorable to the development of the disease were given. But it is important for farmers to recognize that the disease is due to a definite germ, for they will then see how it is that the now well known

remedy of spraying with Bordeaux mixture on the foliage is effective. This operation of spraying must be done about the first of August, when the summer spores or mildew appear, and if about three sprayings are applied to the foliage, ten days apart, a far better crop of potatoes will be grown, whatever the weather may be, than if no steps are taken to control the disease. Repeated experiments had shown that spraying the foliage in this way had produced paying results. Full details with regard to the development of the disease and instructions as to the application of the remedy would be found in bulletin No. 23 of the Experimental Farm series, as well as of another disease which is causing much loss to potato growers. This is the Potato Scab, which is also due to a parasitic fungus. The remedy for this is to soak the seed for an hour and a half in a solution of two ounces of corrosive sublimate in sixteen gallons of water. It must be remembered that corrosive sublimate is extremely poisonous, and every care must be taken not to use the vessels again for putting in them any food and to pour away any of the solution which may remain after the potatoes are treated into a hole specially dug for the purpose in some place where no animals can get at it and where it cannot run into any water supply.

POINTERS TO CHEESE-MAKERS.

Prof. DEAN, who was heartily received, after expressing regret that he had been unable to reach the convention on the previous day, as announced, owing to the starting of the Dairy School, and his having to attend the Western Dairymen's convention at Woodstock, proceeded to speak as follows: I shall confine myself in this address to some points brought out in certain experiments in cheese-making that we have been conducting in the Agricultural College at Guelph. Those of which I shall speak deal chiefly with the matters of temperature, rennet, acid and salt—the leading factors in the making of cheese, providing the milk is all right to start with and you have a good cheese-maker.

TEMPERATURE.

How do we find out the temperature of a room, or of milk, or of anything? We do so by means of what is called a thermometer. A thermometer is simply a measurer of heat, and that is exactly what the word means. There are two kinds of thermometers in general use. The one most commonly seen is known as the Fahrenheit. It is graduated from 0 (zero) to 212, or boiling point. The other thermometer is called the Centigrade or Celsius, because it is graduated from 0 to 100, which represent the freezing and boiling points respectively. Now, the point zero or "0" in the Fahrenheit thermometer does not represent the lowest possible degree of cold, as the inventor thought. He mixed salt and ice, and thought he had obtained the greatest degree of cold possible by so doing. That shows that he did not live in Canada. The freezing point is thirty-two degrees above zero in the Fahrenheit thermometer. It is much easier to make calculations with the centigrade than with the Fahrenheit. A thermometer is made something after this manner: A piece of glass tubing is taken, and by means of blowing a bulb is formed in the end. In that bulb a certain amount of alcohol or mercury is placed—generally the latter. By plunging the bulb in melting ice the mercury will contract to the freezing point, which is marked, and by plunging the instrument into steam it will expand to the boiling point, which is also marked, and then the scale is graduated between these two points. But if the tube is not equal in size all the way through it will not expand or contract equally all the way along, and therefore will not be accurate. It is on account of its evenness of expansion that mercury is selected as being the best substance for registering with in a thermometer. Every cheese-maker should keep one standard thermometer, and not use it for anything else except for testing his other thermometers. If you want to choose a good thermometer get several and place them in water at about sixty degrees as tested by your standard thermometer. If one runs two or more degrees over sixty do not accept it. If it falls much below the sixty reject it also. Take one of those closest to sixty.

The temperature of the milk at the farm is an important thing. I do not think it is necessary to keep the milk as cool as is generally advocated. Before the cheese-maker can start his work he must pay some regard to what we call the ripeness of the milk. Except in extremely hot weather I do not think it is necessary to cool milk. In some places and under certain conditions milk will work fast, and in other cases it will work slowly, and so it is necessary to use judgment. But as a rule it is not necessary to cool milk on the farm. The milk may as well ripen at the farm as have the cheese-maker wait around for it to ripen at the factory. I believe that all milk waggons should have canvas covers to protect the cans from the sun and dust. The man who drives the milk waggon should also be clean. One of our leading factories in the west stipulates that the milk-haulers must wash themselves at least once a week. (Laughter.)

The temperature of the making and curing rooms deserves close attention. I do not think it is necessary to close up the factories and keep them as hot as they are frequently kept. The temperature of the making room should be kept somewhere about seventy degrees. If it is desirable that the curd should be kept warmer than that it can be done by putting warm water under it. The best temperature for the curing room is about sixty-five degrees, and perhaps in the winter time it might be kept at seventy degrees. In the summer time I do not think we can keep the curing room too cool. We cannot pay too much attention to the curing room; and too often it is almost neglected. I am of opinion that the curing room should have a double wall, with an air space all around. We have a simple device in use for cooling our own curing room. We use a large pan, six feet long, three feet wide and four inches deep, placed on an upper shelf. We place a block or two of ice in the pan in the very hot weather, and we find that under these circumstances the temperature will not exceed sixty-five or seventy degrees, when otherwise it might range from eighty to eighty-five degrees.

Let me briefly consider temperature in setting. The best temperature for setting, is I think, about 86°. One or two degrees either way will not make much difference with normal milk. In the case of fast ripening milk we sometimes set at 84°, and occasionally as low as 80°. We have, on the other hand, made some nice cheese by setting slower milk at 90°. If the setting is at too low a temperature, however, there is a tendency for the cream to collect on top of the vats of milk due to the longer time required for coagulation. Certainly it has been our experience that there is more loss of fat when setting at the lower temperatures—80° and below.

Temperature in cooking is the next point to which I would direct your attention. About 98° gives the best results in cooking curd. I believe it would be an advantage to cook not quite so high as is done in some cases. Cooking at from 95° to 97° would perhaps give better results with curds from milk testing three per cent. of fat or below. In cooking, the richness of the milk should be considered. A vat of milk that is rich in fat should be handled in a different way to that of a vat of poor milk; as a rule it needs higher cooking. Cheese made from milk with a poor percentage of fat is likely to make cheese harsh in texture. Cheese made from milk with over four per cent. of fat has a tendency to be pasty and weak in body. A tendency to harshness in the body may be overcome by cooking at a lower temperature and by using less salt, and a tendency to pastiness may be overcome by cooking one or two degrees higher than usual, or by using more salt. Yet I have to admit that the more I study cheese-making the more mysterious the whole thing becomes. There are many difficulties and seeming contradictions. We have made cheese from milk with 2.7 per cent. of fat in it, and the experts have declared it to be pasty, and so also in the case of milk with four per cent. of fat. Higher cooking has a tendency to improve the flavor of gassy curds. By cooking such curds at a temperature of 99° or 100° we found that the flavor of the cheese was improved, but that it made the texture of the cheese somewhat harsher. We gained in flavor but we lost in texture. Now, which of these evils shall we choose? I would say, by all means look after the flavor first of all, for I think we will all admit that in cheese flavor is more important than texture. Cooking from 98° to 103° had no appreciable effect upon the time from setting to dipping, nor upon the per cent. of fat lost in the whey. In two cases there was less cheese from the higher cooking.

The time from setting to dipping is important, but the temperature of cooking seemed to have little or no effect upon the number of hours from setting to dipping. Nor had it any effect upon the time from dipping to salting.

I will say a few words about temperature for putting to press. For this purpose I believe that a temperature of 80° to 85° is about right. I am of opinion that curds are too often cooked at too high a temperature, and too often put to press at too high a temperature. In an experiment when the curd was put to press at 66° the cheese was declared to be finer than that which was put to press at 80°, and both were made from the same curd.

Rennet.

What is rennet? We really do not know very much about it. Bacteriologists tell us that rennet is an unorganized ferment, *i.e.*, without any particular form, while the ferment that changes the milk into lactic acid is an organized ferment, or has a distinct form. A man putting this last named ferment under a microscope can distinguish it from any other form of ferment. Rennet ferment has no particular form or shape, yet it contains that power or quality of coagulating milk which we may call an active principle. Good rennet has a peculiar flavor which you should endeavor to retain. Rennet varies in strength. When a man says "use two ounces of rennet," what does he mean? That is hard to say, for much depends upon the strength of the rennet. Keep a supply of standard rennet, and test all your rennets. In testing the strength of our rennets we take eight ounces of milk from a vat and put it into a glass at a temperature of 86°, and, after adding one drachm of standard rennet, we take the time required for coagulation. We take another eight ounces of milk and add to it a similar amount of the rennet which we wish to test. In this way the two can be compared as to strength. If the standard rennet will coagulate eight ounces of milk at 86° in twenty seconds, and the rennet we are testing coagulates the eight ounces of milk in twenty-four seconds, what is the comparative strength of the two? The relationship is as five to six, or five gallons of the standard rennet is equal to six gallons of the other. However, if the rennet is not too weak, it may make good cheese. Look out for rennets which are made strong with acids. This class of rennet is a cause of much trouble to the cheese-maker. They make soft, weak bodied cheese.

Rennet has a digestive effect on milk. When a calf drinks milk the stomach at once begins to digest it. Of course there is some difference between the rennet when in a calf's stomach and when it is in the milk vat, but the action is very similar. The more rennet we put into the vat the more rapidly the cheese will cure. The casein in the milk is kept in solution by the action of the alkalis present. Acids coagulate milk by neutralizing the alkalis, thus precipitating the casein. But when rennet is added to the milk the casein is chemically changed into two parts, one of which is soluble and the other insoluble. The solid or insoluble we call curd, and out of that we make the cheese. The soluble part runs off in the whey. Theoretically, the sooner we can obtain the coagulation the less loss there is likely to be in the whey. If we use too much rennet, however, we are likely to get the curd too pasty. Where we used from one to two ounces per 1,000 pounds of milk it caused a loss of fat in the whey, and where we used eight or nine ounces there was also a large amount of loss. The extremely small quantity and the extremely large quantity of rennet alike caused an extra amount of fat to pass off in the whey. Where we used four and a half ounces of rennet per 1,000 pounds the cheese got closer the longer we kept it. The cheese made from the milk in which nine ounces of rennet had been placed lost two points in flavor in one month, and lost one in texture, but gained one in closeness. The two ounces of rennet cheese gained in flavor during the second month.

Effect of Acid.

There are two or three ways of determining the degree of acid in curd, but none of these are as accurate or as practical as we would like. The English experts are now using an alkali test for the acidity of milk, which is more accurate than the plan common with

us. We use what is known as the hot iron test. I doubt whether this is really a test of acid in curd. I think that as the curd ripens it gets somewhat stringy, and that the hot iron test reveals the stringiness or flakiness of the curd rather than the amount of acidity in it. When we dipped curds which were sweet, with practically no acid, according to the hot iron test, they had a tendency to break down, and there was a lack of keeping quality about the cheese. In other words they went off in flavor very early. We got better results with the hot iron test, showing one-eighth of an inch. About three-quarters of an inch to one inch of acid at milling has given us best results. I took two cheese to Woodstock for the experts to examine. One of these had been milled at an inch of acid on the hot iron and the other at one and a half inches; and those who tested the cheese decided that the former was the better. We aim to have the curd ready to salt in two and a half hours to three hours after dipping, and about half-way between dipping and salting we mill the curd. (I have used the terms one-eighth of an inch acid, etc., because it is understood by cheese-makers, and also for lack of a better term, though I feel quite sure that the hot iron test does not indicate acidity, but rather a condition of the curd.)

Salt.

What is salt? Salt is a compound of two elements, sodium and chlorine. Sodium is a metal, and it requires to be handled very carefully. If a little of it got on your finger it would burn it severely. Chlorine is a poisonous gas. You need to be careful in testing briny whey with the Babcock tester. Chlorine and sulphuric acid will liberate a gas which it is dangerous to inhale.

The effect of salt in curds is to prevent fermentation. Of course there must not be too much salt put into the curds, else it will check fermentation altogether, and that is not desirable. You can therefore see the importance of trying to arrive at the proper proportion of salt so as to regulate the degree of fermentation. Salt has a great affinity for water or moisture. On account of this tendency to absorb moisture it has the effect of making the curds drier. Another effect of salt is that it gives flavor and body to the cheese. We tested cheese made with half a pound of salt to 100 pounds of curd, and also with one, four and five pounds of salt to the 100 pounds of curd. Where we used only a little salt it gave us a cheese with a very insipid flavor and weak body. The best spring cheese was made by using two pounds of salt to 100 pounds of curd. At the end of three weeks it was not as good as where a less quantity of salt had been used, but at the end of six weeks it was much the better cheese. For cheese to be used soon a smaller amount of salt will suffice, but where it is to be kept for some time use a larger quantity. The more fat there is in the milk the more salt should be used on the curd. We base our salting upon the 100 pounds of curd rather than upon the 1,000 pounds of milk. We use less salt in the spring and more in the fall. In the case of a bad-flavored curd use more salt. I have proved this to be an advantage.

I believe it would be to the advantage of the cheese-making industry if the patrons of the factories knew more about what goes to make a good cheese than they do. If they spent more time in the cheese factories, watching operations and observing the steps of the process, they would be better able to handle their milk. It is only by the hearty co-operation of patrons and makers that the cheese industry can be made genuinely successful. (Applause.)

THE STABLE LIFE OF A DAIRY COW.

Mr. John Gould, Aurora Station, Ohio, was again called upon, and gave the following address: Only a generation ago the announcement that a lecture would be given with the above title would have been treated as a great joke, as cows then, as now understood, had no stable life, and as dairying is now conducted, one can see an evolution that has advanced the care of the cow from her sleeping apartment in the woods, to the present well constructed stable with all modern conveniences, even to water in the mangers, and summer food at hand, and more kept in that stable from winter to spring.

Dairying as practised to-day, and it can be profitable in no other way, is almost wholly an artificial condition. Nature and its way of providing shelter and food supplies is not now being regarded as a safe reliance in the dairying of 1895. About all the cow of to-day shares in common with the one of 1850, is that of the maternal function. To-day we have thoroughbred dairy cows, and the cow of long ago had no breeding that could be called such. Now we have thoroughbred barns fitted for cows, thoroughbred feeds raised with reference to the wants of a milk producing cow, cows soiled in the summer to make the pastures what they should be for the maintenance of the milk flow, and a thoroughbred dairyman to see to these cows, and feed and so care for them that nature is assisted at every step. The "scrub" cow is a product of nature unassisted. A scrub cow and an untutored Indian are as they appear, because of their reliance so largely upon nature for food and protection. Wild horses, Texas cattle, razor-backed hogs and mountain sheep are nature's products. (Laughter and applause.) They are the results of farming without barns, lack of well selected foods, and full sustained rations every day—a succession of feast and famine, extremes of heat and cold, and wars of elements, and the escapes of the tyranny of brute force. This, and breeding from the chance of the survival of the fittest, rather than the mathematical certainties of like bettering like, and more, that the uniting of more than average excellencies raises the scale of quality and development of a quality that soon carries with it its specific conformation. The providing and feeding and sheltering better than nature can, bringing in influences and forces that nature can only hint at, and training that is ever latent otherwise, has given us the improved breeds, and with it an economy that nature must, to succeed even in its way, show great prodigality, so that to-day living profit and courage for the future is given to the farmer who has live stock, where nature left alone only exists, and that at a fearful cost of life and material.

The stable has been a great factor in all this artificial condition that is now found so essential, and it has been a great uplifting power in making the dairy the financial strength it ever assumes, and as we increase the productive power of the cow and economize her food, it is noticed that it was the stable behind it that made it possible to economize that food, and better the cow; for on the one hand it made the summer more nearly a year long, and made it possible to use more of the food to make milk and a better cow, as the barn stood between her and nature, and so she needed to give less of that food to the demands of self-support, which being interpreted means warming barn yards with good food and "shingling" the cow with costly cornmeal to protect her from chilling rain.

I think you readily see the point I wish to make: that the protection from storm and cold, uniformity of temperature, avoidance of extremes of any kind, and an attempt to have 365 days of summer on the farm, lies at the foundation of an all-successful dairying. The liberality of the cow—and all dairying must recognize the fact that beneficence governs—is what we must seek, and all the wants that can be artificially supplied at cost, requires correspondingly less expenditure on the part of the cow, and the greater will be her gifts to us in return; so we ask, when shall this stable life of the cow commence? Ten years before she was born! The calf's mother must be well cared for. The idea of parental influences is becoming stronger each day with the best breeders, and while the cow is carrying the calf, the care, feed and other influences that surround the mother cow will be more strongly inherent in the future calf. So I would have the mother of the calf well stabled, fed and cared for, and then if circumstances were such that I could as well care for the calf, let it be dropped in the early fall, but if a spring calf, let it remain in the barn the first summer; here it can be well cared for and fed. Remember now that this calf is the cow's baby, and in some things is not different from our little folk in the house. Do not feed it on cold sour milk, and because it refuses to drink, hold its head in the pail with a stout hand, guided by an intelligent (?) mind, with a purpose born of manliness, give an exhibition of drinking or drowning. Feed it warm sweet milk, in which there is a little cooked oatmeal; later on add oatmeal, and when cud chewing commences give it whole oats and some fine hay.

For the first summer, I repeat, keep the little calf in the barn. Do not turn it out in the big meadow or any other field, but in a roomy stable where the food goes to the

calf, and not to a horde of hungry flies. We do not care to furnish food to them. We want to build up a dairy cow. The time has passed when we can go into the street and take up any cow and make money. Let us feed this calf to develop bone and muscle, and not fat, and build up the cow we want.

The moment the young calf comes into the dairy we want to put the feed to it—the food that we want is food that will make milk. Let us find this calf nitrogenous food. Do not feed it solid food till it can digest it. Timothy hay should not be fed to it. Its little stomach will not digest it. Let us wait till the calf begins to chew its cud, then solid food may properly be given and will assist it in coming to a good growth.

The future value of the cow depends much on the care given the calf during the first winter. If neglected the first winter, spring may find us with a calf worth five dollars—about what it was worth when five weeks old. Let us have a calf that grows all the time—that develops quite as much in winter as in summer. For this purpose we should feed it to produce growth, and bone and sinew, and not fat. To be all right it must have a capacity to eat.

The heifer should come in in the fall, when twenty-four months old. I believe in training a heifer so that when she comes into the dairy she comes in with cow habits, and will milk the first time without raising her foot. She should run with the dairy cows, be stabled and come into the dairy with dairy habits. I would feed her liberally with bran for that developing life she is having to supply.

I do not believe in too much tomfoolery about her; I do not believe in children teaching her to fight. I would have her handled. Please do not teach her vicious habits. Make her believe that she is a cow. One of my heifers had a calf out in the pasture. I sat down by her in the middle of that forty-acre field and milked her, which I thought far better than to tie her or put a rail across her back.

What is the stable for? With that stable life we prolong her milking days, and keep up the development of milk. The stable of the future will be built differently from the stable of the past. The cows should have the best kind of a stable with windows in it. It should not be damp and chilly and dark, with no chance to light it and no chance to warm it, and where you will not get the results you should for your feed. We had such a one which we converted into silos and box stalls. Outside of that we built our cow barn. We had one then with double walls and lined with matched lumber, with each cow occupying a stall room of three feet and six inches, and with a ventilator, so we can temper that stable just as we wish.

I am not in favor of turning cows out in the winter. I am an advocate of each cow having her bath in the sunshine every day, which we can have if the windows are so placed that the sun shines in on all sides.

But if cows are to be kept in the stable from fourteen to sixteen weeks in the winter, they must have their surroundings in good keeping with the demands, and that is pure air, a stable free from bad smells and foul odors, a stable free from dampness, and above all one in which the temperature does not go below forty degrees. The importance of sunlight must not be overlooked. We turn cows out of the stable more on account of the beneficial effects of sunshine than any other demand; so in the stable, if the cows are to have continuous stabling, there must be windows and sunshine. To this end, the stable that is in the form of an "L," extending south from the barn, with its windows on east, south and west sides, fulfils the demand for light and sunbaths. No stable should ever be tolerated any length of time that implies a condition of turning out the cows to add to their comfort. The lighting of a barn is not as hard a problem as the ventilation, and this is solved largely by two features, a water tight gutter into which absorbents are placed every day as soon as the stables are cleaned, and a liberal use of road dust as a deodorizer, a substance as good in many respects as land plaster. The only thing that is urged against its use is that it only costs the trouble of collecting, though land plaster is to be highly commended. The other matter is plenty of room for each cow, so that she shall have at least 600 cubic feet of air space, and more would be better. Then if the old fashioned plank floor laid on a cob house foundation, or big joists up two or three

feet above the ground, is discarded, and the floor is either cemented or made of well pounded down clay on the immediate surface, there will be little chance for the formation of noxious smells and foul air. Just where the line of exercise for the winter milch cow is to be drawn, is a hard thing for many to settle, but if a man has a well appointed stable and can keep good sanitary conditions the matter will settle itself, just as it is rapidly being done in the cases of hundreds of men who, when they have once tried it, say that continuous stabling is far the best way, and that exercise beyond the health demand is at the expense of milk; so with the good stable the exercise problem is one that solves itself. This stable should be made pleasant. We think a cow, other things being equal, will "enjoy" being in a nice stall and stable far better than in a close, dark, damp one.

Keep the stable whitewashed. A whitewashed stable looks a great deal more cheerful. I believe a cow has more humanity than we give her credit for; I believe she should have her own home. The cow becomes wonderfully attached to her home, so do not keep changing her around. I recall an instance when it became necessary to make some changes in the stalls of my cows. They were in different stalls for about twenty-four hours. Their actions told very plainly that they were homesick. Let every cow have a place of her own in which to stand.

Another thing about tying up cows. You know an animal can be taught to do almost anything. I was brought up to think the stanchion was just the thing. A stanchion is an instrument devised for punishing man. We have changed it for putting a cow in. I have discarded the stanchion altogether and use the chain. The stanchion is going, and going very fast; the chain or rope is coming in very fast. The swinging stanchion is beginning to be the thing, giving the cow all the freedom possible.

We do not begin as a rule to tie up the cow early enough in the fall. We have an idea that she has got to go through a toughening process to make her hardy. We can feed her and make her hardier than we can freeze it in by letting her stand out. Whenever we want fires in our houses, then we want the cows in a warm stable. If the cow becomes chilled through, she must shrink in her milk, and extra feeding is required to bring her back to her former standard. We do not as farmers give feed enough to the cow. We assume that the frosty grass of October is good enough food for her. At the same time if she was fed better the results would be far more satisfactory to us. Last year I had a good field of clover half a mile from the house; we divided the dairy and sent five into that clover field, frosted two or three times, and kept the others in the barn. The cows that went to the lot shrank in their milk, while those that remained in the barn gained. The food was expended in exercise. Next fall we shall not try any frosted clover. Those that are not in milk I shall not be quite so particular about, but the winter milker shall have her food at the barn, and be so cared for that the ration she eats shall cost her little for travel, and be of a quality better than frosted herbage. There should be no abrupt changes from fall to winter, and so supplied with attention that so far as food and warmth are concerned, she shall not know that such a thing has been going on as a change from fall to winter, for if we accustom this cow to feel the blasts of winter, the relaxed condition of the system, that is the great thing in milk production, must give way to a feature of self protection and shrinkage of milk results, and when this takes place it costs roundly in extra food to re-establish the flow again.

This stable life allows the farmer to soil his cows with exactness, either in whole or part. The time has passed when the dairyman can rely upon the summer pasture for the sole food of his dairy, and in the winter, summer foods are in demand, for he finds that with a warm barn and a contented cow in it he can feed these abundantly grown and cheap succulent foods, and winter a milch cow cheaper than he used to a dry one fed on hay, and I do not think that a dairyman can longer afford to feed very much hay. Why, if an acre of silage winters two cows, an acre of good clover one, and it takes four acres of pasture to two-third summer a cow, why do we keep on mowing one-half of our farms to winter a dry dairy, and pasture the other half of the farm to make cheap milk?

Perhaps if I give you a glimpse of my own practice the idea of wintering cows in milk may be made a little more practical than any sort of generalizing, and while it does not essentially differ from the practices of hundreds of other dairymen east and west, it may to some of you seem a little advanced, especially in comparison with the stable life of the cows when I was a boy, which the greater part of the winter consisted of being fed hay at the stack and sleeping in the woods, and, as is recalled by the older ones here, that cow hides that started trade in the spring.

We aim to have our cows come in during the fall months, and get the flow of milk established before winter. We provide soiling crops to keep up the feed and flow of milk, and feed in addition a small ration of grain. We have as yet found nothing better than sweet corn up to the time that the southern silage corn gets well eared out. Clover is far better cut and fed in the mangers than to allow the cows to graze it. We begin to keep the cows in nights by the 10th of October; and later on if heavy rains are falling, and chilly storms of any magnitude, they are not turned out during its prevalence. As the weather become colder they are kept in more and more, until the 1st of December, when they are left in the stables continuously until the warm days of spring.

As soon as the corn-stalks and roughage are well fed up, the silo is opened and then winter feeding begins. Then we settle down at once to twice a day feeding all they will eat up clean and no more. We would say that each cow has her own place and is never tied anywhere else. The rigid stanchion has been discarded, and when it was abolished in New England as a torture for human criminals, it should have been made into kindling in the cow barns, for no amount of argument will set aside the fact that they are anything else than a handy way to fasten cows, and every argument for them is from the man's side of economy of *time* and the like. If there are to be winter calves dropped, have a "nursery" box stall right in the stable, so that the cow that is to need it will not be forced to go into some other part of the barn, into a strange place and a colder temperature. A cow is a great home body in regard to her winter quarters, and this feature should be humored.

The milking should be regular as to time and the feeding as much so. Decide upon a time to milk and feed and stay by it. We think it best to feed immediately after milking, then all is quiet and there is no looking and reaching after fragments of food, and the attention of the cow is "on the milking" and not something else. Our ration is for each cow daily divided into two feeds, fifty pounds silage, five pounds hay and six pounds of mixed grain, largely wheaten "seconds." Before the cows is a V-shaped trough at the top of the sloping manger that furnishes them their water. To avoid the trouble and risk of warming water for them, we have a large thirty-barrel iron tank in the stable, and it is kept full from a deep rock well near by, and this keeps the temperature not far from that found in the stable, and we think it is as well as if it was warmed. About two hours after the ration has been eaten, and by the way the hay is fed immediately after the silage, the trough is filled full, the supply pipe from the tank left open, the cover of the troughs turned down, and the cows are now ready to take a full draught of water. We do not like to have them drink and eat at the same time, and besides, they fill the trough with meal, silage, hay and the food generally. Then these cows sleep, chew cuds, dream and take life easy until milking time at 5 p.m.

In the spring, the fall customs are largely repeated, and about the last of May the cows are left out nights. When these cows that have been milked from the year previous come to grass, they take on a new resolve to milk up with the best of them, and as a rule, for ten weeks they give almost fresh messes, and then in the last weeks of July and the torrid month of August they are dry—some of them, and when the first ones become fresh in the early fall others are yet giving fair messes of milk, so that now our winter dairy under this course of feeding and care has actually become an all-the-year-round dairy and gives us a little income all the time, which is and has proven a pretty good weapon to keep the "wolf away from the door."

The stable life of the winter milker is a question of great importance. We as dairymen have got to manage for both summer and winter. We as dairymen have to

make three hundred and sixty-five summer days on the farm. Let us have our dairies bring in something every day in the year. We should put intelligence in our work and create a love for our business. Let us learn all we can about it and quit holding grumble meetings. Instead, let us try to raise our occupation to a higher level. We must do this if we ever reach our proper position as dairymen, and when we become dairymen in truth and practice we will find that the stable life of our cows are their most profitable days, and so not because of "good luck," but rather management based upon facts, and each and every one of these facts in accordance with the cow's idea of comfort. (Applause.)

THE KINGSTON DAIRY SCHOOL.

Mr. J. A. RUDDICK, Superintendent of the dairy branch of the School of Mining and Agriculture at Kingston, delivered an address upon the work done for dairying in that institution. He said that the number of applications received up to date for 1896 was seventy-eight, against fifty-three at the same time last year, and that there were twenty-one applicants for the special course. Fifteen of last year's students had returned to get fuller instruction. The following facts were then presented by Mr. Ruddick:

The School of Mining and Agriculture, Kingston, Ont., aided by the Departments of Agriculture of the Dominion and the Province of Ontario, opened its dairy school on Thursday, December 13th, 1894.

The School was under the management of Jas. W. Robertson, Dominion Dairy Commissioner, and one of his assistants, J. A. Ruddick, was resident superintendent and instructor. He was assisted by L. A. Zufelt, instructor in butter-making, and G. G. Publow, instructor in cheese-making.

There was a series of eight regular courses, specially for cheese-makers and butter-makers who had the experience of working for at least one season at one of these branches. Each course included practical instruction for two weeks in either cheese-making and the testing of milk, or butter-making and the testing of milk. A student was allowed to take both courses. The School was open equally to male and female students.

In addition to the practical demonstrations and illustrations in the School, a course of evening lectures was given on the following subjects:

"Chemistry of Dairying," by Professor JAMES, Deputy Minister of Agriculture.
"Carbonic Acid; its Relation to the Mineral, Plant and Animal World," by Professor GOODWIN.
"Clay and its Silvery Metal," by Professor GOODWIN.
"How Flowers Make Insects Work for Them," by Professor JAMES FOWLER.
"Rocks and what they are made of," by Mr. W. G. MILLER.
"Entomology, a Branch of Practical Agriculture," by Mr. JAMES FLETCHER, of the Experimental Farm, Ottawa.
"Asbestos and Mineral Wool," by Professor NICOL.
"Color in Chemical Study," by T. L. WALKER, M.A.
"Social Life of Animals," by A. P. KNIGHT, M.A.
"Beet Root Sugar," by Mr. ROBERT LAWDER.
"The Cheeses of the World," by Professor RUDDICK.
"Nitrogen," by Professor GOODWIN.

The lectures in the School included "The Composition of Milk," "Milk Testing," "Butter-Making," "Cheese-Making," etc., etc.

The building is so constructed as to provide a model butter and cheese factory, with special rooms for milk testing, lectures, etc. It is located almost in the centre of the city, and good board and lodging can be had in its vicinity at prices ranging from $2.50 to $3 per week. On reaching the city students should take the street cars from the railway station and ask the conductor to let them off at the corner of Barrie and Union streets, near the School building.

The following are the names of the students who attended the School during the past winter :

Name.	P. O. Address.	
Armstrong, H. T	Manotick,	Ont.
Breman, Wm	Deseronto,	"
Berlanguet, J. W	Admaston,	"
Buell, A. W	Caintown,	"
Brown, Lester	Athens,	"
Blanchard, L. F	Athens,	"
Babcock, A	Wilton,	"
Buro, J	Milleroches,	"
Bruyere, A	Embrun,	"
Burwash, J. F	Brewer's Mills,	"
Bowers, D	Renfrew,	"
Campbell, Geo. D	Renfrew,	"
Cramer, J	Glenvale,	"
Cook, J. L	Warburton,	"
Cochrane, Chas	Sunbury,	"
Culbert, B	Athens,	"
Cochrane, Wm	Glenburnie,	"
Currie, A. P	Vancouver, B. C.	
Chuthem, S. S	Morton,	Ont.
Clark, Jas. F	Balderson,	"
Cochrane, R. B	Glenburnie,	"
Davy, G. L	Murvale,	"
Dean, W. N	Moira,	"
Dean, J	Moira,	"
Dougherty, Jas	Elginburgh,	"
Dicks, C. H	Lennoxville, Que.	
Embury, Thos	Thomasburg,	Ont.
Eastman, Thos	Metcalfe,	"
Elliott, R	Carp,	"
Echlin, John	Balderson,	"
Fairfield, H. E	Belleville,	"
Ferris, Miss E. M	Elginburg,	"
Free, H. R	Cold Springs	"
Fitch, U	Boonville, N.Y.	
Fernier, A. A	Scotch Line,	"
Fitzgerald, Wm	Yarker,	"
Gould, Peter	Napanee,	"
Glover, Hugh	Jones' Falls,	"
Glasgow, W. C	Cannamore,	"
Gibson, G. M	Douglas,	"
George, John	Cataraqui,	"
Gagner, Jos	Embrun,	"
Guthrie, Wm	Perth Road,	"
Guthrie, Miss M	Perth Road,	"
Hogan, James	Mt. Chesney,	"
Hurst, G. A	Gananoque,	"
Henderson, Jno	Winchester,	"
Herity, A	Moira,	"
Hutcheson, J. B	Sharbot Lake,	"
Hill, Wm	Frankville,	"
Hall, Wm	Woodstock,	"
Hardy, R. A	Bowesville,	"
Johnson, J. F	Kepler,	"
Jackson, Simeon	Huntington,	"
Keenan, J. J	Kingston,	"
King, D. L	Sydenham,	"

Name.	P. O. Address.	
Kearney, Joseph	Morton,	Ont.
Kenney, Jos	Kingston,	"
Keefe, D. O	Elgin,	"
Leroux, G	Summerstown,	"
Loverin, E. W	Greenbush,	"
Lennan, Barney	Godfrey,	"
Lowergan, J. J	Warkworth,	"
Morton, H	Moira,	"
Morgan, J. E	Kingston,	"
Murphy, P. J	Bogart,	"
Mercer, J	Mallorytown,	"
McNeil, E. L	Lansdowne,	"
McCann, J. D	Perth,	"
McDonald, J. A	Admaston,	"
McAlonan, Jos	Seeley's Bay,	"
McDonald, Wm	St. Lawrence,	"
McConnell, J. D	Dominionville,	"
McNamee, James	Stanleyville,	"
McDonald, H. A	Sunbury,	"
McCowan, D	Maxville,	"
McRae, C. F	Moore Creek,	"
Nolan, Peter	Phillipsville,	"
Newman, J. W	Spencerville,	"
Newman, Wm	Prescott,	"
Pennock, J	Hartington,	"
Patterson, Thos. J	Sunbury,	"
Porter, Geo	Elginburg,	"
Redden, Ed	Portsmouth	"
Renwick, Geo	Lang,	"
Raney, Neil	Mainsville,	"
Rice, F. A	Currie's Crossing,	"
Rone, Fred	Mt. Chesney,	"
Stafford, W. W	Lansdowne,	"
Stanley, R. J	Morton,	"
Smith, P. L	Haley's Station,	"
Spowart, Thos	Stella,	"
Scollard, Jas	Ashdod,	"
Stringer, M. P	Sand Bay,	"
Stringer, M. G	Sand Bay,	"
Suthall, David	Mt. Chesney,	"
Storms, C. B	Wilton,	"
Smith, J. E	Sunbury,	"
Sinclair, J. C	Brandon, Man.	
Somerville, F. J	Morton,	Ont.
Tehan, M	Westport,	"
Totten, H	Renfrew,	"
Trousdale, P. W	Sydenham,	"
Thurston, R. M	Dunsford,	"
Thompson, J	Gananoque,	"
Wilson, James	Carswell,	"
Wellborn, Miss G	Kingston,	"
Ward, R. W	Wallbridge,	"
White, F	Sidney Crossing,	"
Webster, M. G	Kingston,	"
Wilson, Wm	Renfrew,	"
Walroth, J. W	Maberly.	"

ATTENDANCE BY COUNTIES.

Frontenac	32	Students.
Leeds	21	"
Hastings	10	"
Renfrew	10	"
Lanark	6	"
Carleton	4	"
Glengarry	3	"
Grenville	3	"
Stormont	3	"
Lennox	3	"
Oxford	2	"
Russell	2	"
Northumberland	2	Students.
Victoria	1	"
Peterboro'	1	"
Addington	1	"
Dundas	1	"
Manitoba	1	"
British Columbia	1	"
Quebec	1	"
New York State	1	"
Total	109	

ATTENDANCE BY COURSES.

Course beginning.	Butter. No. of students.	Cheese. No. of students.
December 13th, 1894	6	6
December 27th, 1894	8	10
January 10th, 1895	11	16
January 24th, 1895	8	14
February 7th, 1895	9	15
February 21st, 1895	11	14
March 7th, 1895	12	23
March 21st, 1895	6	19
	71	117

1 student remained at the School				16 weeks.
1	"	"	"	12 "
4	"	"	"	10 "
3	"	"	"	8 "
22	"	"	"	6 "
				4 "

The average stay was 4 weeks.

Summary of Attendance.

124 applications were received.

109 students attended the School.

70 students took the cheese course only.
13 " " butter "
26 " " both courses.

ANNOUNCEMENTS FOR 1895-96.

Management. The School will be, as last year, under the direction of James W. Robertson, Dominion Dairy Commissioner.

The staff of instructors will include superintendent and lecturer, instructor in butter-making, instructor in cheese-making, instructor in milk testing.

Courses. An ordinary course will provide practical instruction for two weeks in either cheese-making and milk testing, or butter-making and milk testing. In addition to the practical work, lectures will be given on the following subjects: "Business Management," "The Composition of Milk," "Milk Testing," "The Preparation of Milk for Cheese-Making," "The Principles of Cheese-Making," "Practical Cheese-Making," "The Separation of Cream from Milk," "Butter-Making," "Creamery and Cheese Factory Machinery," "Care of Engine and Boiler," etc., etc.

The ordinary courses will begin on the following dates:

1st	course,	Tuesday, Dec. 10th, 1895.	5th	course,	Thursday, Feb. 13th, 1896.
2nd	"	Thursday, Jan. 2nd, 1896.	6th	"	" Feb. 27th, 1896.
3rd	"	" Jan. 16th, 1896.	7th	"	" Mar. 12th, 1896.
4th	"	" Jan. 30th, 1896,	8th	"	" Mar. 26th, 1896.

The number and attendance at each ordinary course is limited to thirty—fifteen in the cheese-making and milk testing department and fifteen in the butter-making and milk testing department.

A special course in cheese-making will begin on February 13th and continue until March 26th. This course is intended to provide for a more advanced study of the art of cheese-making than is practicable in the ordinary courses. Besides the practical work of cheese-making and milk testing each day, students will be required to attend the lectures in the ordinary course and also a series of lectures on more advanced work. Some work of research will be conducted with and by the students; and a certain amount of reading will be prescribed.

Conditions of Admission and Fees. Any person over sixteen years of age who has worked at least one season in a butter or cheese factory is eligible for admission to the ordinary courses.

Admission to the special course in cheese-making will be limited to those who have had at least two years' experience working in a cheese factory.

Each student will be required to pay a registration fee of $2, which will entitle him to free tuition for four weeks, viz., two ordinary courses in either cheese-making or butter-making, or one course each. For each additional course, or part of a course, a fee of $1 will be charged. Each student in the special course will be charged $1 in addition to the registration fee of $2.

Certificates. A certificate of attendance and application will be granted to each student who (1) attends all the lectures during two ordinary courses or during the special courses, (2) is not absent from the school during the hours of work without a reasonable excuse, and (3) shows a desire and capacity to profit by the instruction given.

Diplomas. Each student in the special course who passes a satisfactory examination at the end of the term, and who proves to be a careful and competent cheese-maker and manager by successfully conducting a factory during one season after leaving the School, will thereafter be entitled to a diploma.

General. It is the intention of the Board of Governors to open a library and reading-room in connection with the School this year.

All correspondence in reference to the School may be addressed to "The Bursar, School of Mining and Agriculture, Kingston, Ont.," and after 15th November, to "The Superintendent, Dairy School, Kingston, Ont."

During the special course in cheese-making lectures on bacteriology will be delivered by Dr. Connell, of the Royal Medical College, Kingston.

Mr. J. A. Ruddick is again superintendent, with the same staff of assistants as last year.

VOTES OF THANKS.

Moved by Mr. EDWARD KIDD, retiring President, seconded by Mr. HENRY WADE, President-elect, That the thanks of this Association be and are hereby tendered to the citizens of Campbellford for their hospitality, and also to the press and railway companies for courtesies extended. Carried by a standing vote.

The Convention then adjourned to meet at two o'clock, p.m.

THIRD DAY—AFTERNOON SESSION.

The President-elect, Mr. HENRY WADE, of Toronto, called the meeting to order at two p.m., and congratulated the Association upon the large number who had remained over until the closing session. He further said: Although not now in the cheese business I think I have the honor of being one of the earliest makers in Eastern Ontario. In fact there were few cheese factories in Canada when I began making cheese. The year after the first co-operative factory was started at Ingersoll I started one in Port Hope. Of course the modern methods of cheese-making are somewhat different to what they were when I began making in the sixties. But, as the older members of this Association know, I have been keenly interested in the progress of the industry, and have been almost a constant attendant at the Eastern Dairymen's Convention. I shall do what I can to forward the best interests of the Association during the coming year, and I thank you heartily for the honor you have conferred upon me. (Applause.)

REPORT OF INSTRUCTOR PUBLOW.

As the work of instructor and inspector is much the same from year to year, this seventh annual report must necessarily be more or less similar to that of other years.

While the number of applications for instruction was not so great as last year, yet there were more than any one man could possibly attend to. In all 117 factories received 210 visits, as follows :

Stations.	Visits.	Stations.	Visits.	Stations.	Visits.
Salem	3	Robinson's Mills	1	Opinicon	1
Mountain View	3	Rosedale	1	Lombardy	1
Ardmore	3	Mississippi Pride	1	Roseville	3
Lake View	2	Maple Leaf	1	Burritt's Rapids	3
Fermoy	2	Rosebank	1	Carleton Model	1
Westport	2	Barryvale	1	Prospect	1
Mississippi	4	Ventnor	1	Jockvale	1
I. X. L	3	Farmers' Own	2	North Gower	1
Boyd's	2	Ashton Union	1	Carp	1
Pakenham	1	Elmdale	1	Kinburn	1
L. and D	3	Farmers' Friend	1	Hazeldean	1
Clyde	3	Chantry	1	Union Pride	1
Middleville	3	Plum Hollow	1	Dunrobin	1
Hopetown	3	Farmers' Pride	1	Stittsville	3
Poland	3	North Star	2	Manotick	1
Ardoch	3	Shanley	1	Hemlock Corners	1
Watson's Corners	3	Glen Buell	1	South Branch	1
Brookside	3	Silver Creek	3	North Rideau	1
Maberly	3	Clear Spring	3	Goodstown	1
Zealand	1	Forfar	3	River View	1
Bolingbrook	1	Myers	1	Daisy	1
Clairview	1	Gilt Edge	3	Roebuck	1
Tayside	1	Lyndhurst	3	Malakoff	3
Tay Banks	1	North Shore	3	Independent	3
Riverside	4	Stanleyville	3	Twin Elm	1
Dexter	1	Leo Lake	2	Carsonby	1
Drummond	3	Frankville	1	Maple Hill	1
D. and E	3	Appleton	1	Spring Vale	1
Elmgrove	3	Ontario	3	Holland	1
Mud Creek	2	Mountain	2	Fairfax	1
Elbe	1	Island City No. 1	1	Cold Brook	1
Lily Spring	3	Island City No. 2	1	Lorne	1
Palace	3	Centreville	3	Caintown	1
Smith's Valley	2	Bedford Mills	3	Gananoque	1
Portland	1	Clear Lake	1	Rapids Valley	1
Farmersville	1	Rockdale	1	Deer Lick	1
Greenbush	2	South Lake	2	Farmers' Union	1
Orchard Valley	2	Morton	1		
Maple Valley	1	Osceola	1		

I had J. D. McCann as my assistant for eighty-one days, of which he spent seventy-one in giving instructions and testing milk in factories, four travelling, three attending court, two settling fines, one detained by rain.

Of the 150 days which I was in the Association's employ, 139 were spent in factories giving instructions and testing milk, six in travelling, two settling milk cases, two detained by rain and one attending the Board of Trade.

Of the 10,150 samples tested with the Babcock and lactometer, fifty-two were found to have been tampered with, and of these fines were collected from thirty-two to the amount of $600, one-half of which went to the factories in which fines were imposed, and the other half to the Association, out of which was paid lawyers' fees and costs of court, leaving a balance of $250 to their credit. The amount contributed by factories was $725, making a total to the Association of $975. Does not this large number of deteriorated samples after so many years' inspection prove the necessity of paying for milk according to quality or percentage of butter-fat?

Perhaps I should make special mention of three cases tried, two of which the Association lost, the magistrate deciding that the milk had been tampered with, but in his judgment not by the accused parties, and dismissing the cases with costs to the Association.

In the third case a fine of thirty dollars and costs was imposed, but an appeal to this decision has been made on the ground that a previous conviction against the same man was used as evidence in the case.

Regarding inspection of factories I found the majority in very good condition for cleanliness and equipment for making cheese. Indeed, quite a number are all that could be desired. The cheese I found to be on the whole of very good quality, but in some sections difficulty was experienced with greasy curd and bad flavor. This I attribute to the peculiarity of the season and condition of milk. The season being dry the cows fell off in their milk, which consequently became very rich in butter-fat, apparently having more fat than the curd could contain. This difficulty was experienced until rain came and grass was plentiful.

The bad flavor I attribute to cows drinking impure water, and to the situation of milk cans over night. I find that where this flavor exists the patrons are careless, having their milk stand over night in milk yards or barnyards, the stench of which affects the milk to such an extent that its manufacture into fine-flavored cheese is impossible. It is astonishing, notwithstanding all that has been said and printed, that people will still persist in keeping their milk in such places.

In conclusion I would say that if we are to retain the proud position we hold to-day as a cheese-producing country, and attain the highest degree of perfection in the business of which we are promoters, the farmers must come to the aid of the cheese-maker by having their milk delivered at the factories in a better condition than is at present done, as I am satisfied that the average cheese-maker is doing his best under existing conditions.

All of which is respectfully submitted.

G. G. PUBLOW.

AN INTERESTING DISCUSSION.

Mr. R. G. MURPHY: We would like to hear a little more from Prof. Dean regarding the use of salt in cheese-making.

Prof. DEAN: Regarding the quantity of salt to use, I would say that if you are making a spring cheese, to be eaten soon, as all spring cheese should be, you should use only a small quantity of salt, say about two pounds of salt per 1,000 pounds of milk. With a moist curd use more salt, and with a dry curd use less salt. If you intend to hold over the cheese use more salt, perhaps two and one-half to three pounds per 1,000 of milk. In regard to the quality of salt I think that a good cheese salt should be in the first place free from all impurities. Salt is an absorbent of impurities. If you leave salt in a room where there is a bad flavor the salt will absorb it. Salt for cheese-making should not be as fine as that used in the making of butter. If the salt dissolves too readily it runs off in the whey in the form of brine. Salt should be even in grain, and therefore do not use a salt which has some large and some small crystals. Then, again, you should prefer a dry salt. A damp salt usually means an impure salt.

Mr. R. E. HOARD: When do you ripen the milk?

Prof. DEAN: We use a starter. We prefer to select the best flavored milk we have in our dairy, and we warm it up to about 90° the day before we use it. When it begins to sour we put in about fifty per cent. of water at a temperature of about 65° or 70°. If it is going to sour too fast use cold water; if not ripening fast enough use warm water. Stir this starter well into the milk, and set in a warm place until the morning. Then we take the top half-inch of the starter and throw it away in order to avoid germs of fermentation. We stir it up and mix with the milk. Of course the use of starters has been abused. A bad starter is worse than no starter at all. If the milk is ready to set at ten o'clock without a starter it is not advisable to use any starter. I think that properly used the started is an aid to the cheese-maker; but the starter abused is a curse to the cheese-maker. You may strain your starter in order to get rid of any curds that may be in it.

Mr. FREE: Don't you think that 60° is very low? In hot weather the thermometer in the factory often reaches 90°.

Prof. DEAN: I do not think it would pay you in summer time to cool the milk down to the temperature you name.

Mr. HOARD: Suppose your milk is sweet in the morning, what amount of starter should be used? Would it pay to let the milk remain in the vats, or use a starter?

Prof. DEAN: I would use a starter. Ordinarily about one per cent. is sufficient for a starter, but in that case I would use about five per cent., and I would make the rennet test at the end of half an hour or an hour. The rennet test should always be made in a vat of milk before the starter is added, for it might be that you would thus find that the milk did not need a starter. If you put in the starter before testing by the rennet you might find yourself, as the boys say, in the soup. You see you have to use judgment in these things.

Mr. HOARD: What is the reason of cheese cracking?

Prof. DEAN: I think the chief reason is that the curing room is too dry. Every curing room should have what is called a hydrometer, which will measure the moisture of the atmosphere. The other day I noticed that our hydrometer indicated that the room was too dry, and thus we were able to remedy it.

Mr. WHITTON: Don't you think that it is often caused by the windows being left open and the warm, dry air passing through?

Prof. DEAN: Yes.

Mr. HOARD: I let my windows open at night, when the air is cool and moist.

A MEMBER: Would you advise each patron to get a Babcock tester?

Prof. DEAN: I believe that every cheese factory should have a Babcock tester whether it pays by the test or not; and I would go further and say that every man who keeps cows should have one.

Mr. FREE: What about the time for setting?

Prof. DEAN: I would say in the spring from two to two and a half hours, and in the fall from two and a half to three hours.

A MEMBER: What do you think of farmers salting their milk?

Prof. DEAN: It is a very bad practice, and should never be done, as salt affects the action of the rennet.

A MEMBER: What is the price of the Babcock tester—the size a farmer would want?

Prof. DEAN: You can get a four bottle machine for five dollars.

A MEMBER: What about checked cheese?

Mr. PUBLOW: Do you ever examine your cheese to see if they are checked? Most checked cheese have become so by the curd being too oily. When the curd is greasy the particles cannot properly unite, and their failure to knit causes the checking. There is a small spot in the bandage cloth that will not unite, and it will cause the check. The cheese may bore all right, but if you will break off a piece of the cheese you will find that it is not as it should be. When the cheese is pressed the grease is pressed out of it, and lies on the outside of the rind. The class of cheese that will check is that which has been cooked too fast. It has been stirred out roughly, and the acid goes on so fast that the cheese is too moist. If you harden it up it will seem to be all right, but in a few days you will find it crack with a sudden change of air. Set your milk earlier in such a case, so that it will ripen in two to two and a half hours. There is often a danger of keeping a cheese too warm after taking it out of the whey. I cook at ninety-six degrees. Pile your curd if it is going slow. If it is going fast lower the temperature and do not pile. If it ripens too rapidly you will have an acid cut cheese probably. If I had a bad flavored curd I would always aim to have it cooked before the acid came. If I had bad flavored curds and gassy milk I would certainly use a starter.

Mr. MURPHY: A man told me that a maker asked him to sell his cheese. He was loth to do so, as they were poorly put up. However, as they had a good flavor they passed. The claim had been made in this connection that when a bad flavor was detected in the curd it was killed by saltpetre. What do you think of it?

Mr. PUBLOW: I do not think that would kill the flavor, but it would be more likely to preserve it. The best preventive of bad flavor is to have the milk in perfect condition. Be careful when you aerate the milk; and certainly do not do so near a stable. Air it where the atmosphere is pure and sweet. If the milk is as cool as the atmosphere or cooler, you may cover it up closely. If the milk is ripening too fast—cool it to the temperature of the atmosphere. Aerate milk by holding it up to the air in as small quantities as possible. It is a question about so-called gassy milk whether it is a result of gas or bad odors. I think it comes from the milk absorbing bad odors.

ADDING TWO PER CENT. TO FAT READINGS IN CHEESE FACTORIES.

Prof. DEAN, of the Ontario Agricultural College, gave an address upon the above-named subject, similar in character to that reported in the proceedings of the Western Dairymen's Convention, under same cover as this report. He gave the following mathematical explanation of the two per cent. system:

Suppose that one patron's milk tests three per cent., and another tests four per cent. In this case we have seven units of fat to divide according to the simple reading of the fat. One man ought to receive three units and the other four units. Or if we put it in the shape of a ball of fat weighing seven pounds, one man is entitled to receive three pounds of that ball and the other four. One man receives three parts (sevenths) and the other four parts (sevenths). The relation is 3-7 to 4-7, or 3 to 4. Now, when we add the two per cent. to each, we make the one (3 + 2) 5, and the other (4 + 2) 6. In other words, instead of having a ball weighing seven pounds, we have one weighing eleven pounds, and the relation is 5-11 to 6-11, or 5 to 6. Instead of there being a difference of *one-seventh* in the amount of fat (money) obtained by two such patrons, the difference is but *one-eleventh*, which corresponds more nearly to the actual difference in the cheese yield from such milk. An increased percentage of fat in the milk increases the cheese yield in all normal cases, but the increased yield of cheese is not in proportion to the increase in fat. There are six compounds which make up the substance we call milk, viz., water, fat, casein, albumen, sugar and ash. Of these but two—fat and casein—are of value in cheese-making, assuming that the water has no value, and ignoring the small amount of the other compounds which enter into cheese, these being foreign to the matter under discussion, though, of course, of importance in making and giving value to cheese as a food. The cheese-maker adds rennet to milk under certain conditions, which rennet acts on the casein and indirectly on the fat. The amount of cheese which can be made from milk in good condition, and with a skilful maker, depends upon the fat and casein present in the milk. The fat may be readily determined by the Babcock tester, but the casein can be determined only by chemical analysis, which is an expensive operation. However, the percentage of casein remains fairly constant in all our samples of normal milk, averaging about 2.3 per cent. I estimate that the present per cent. of casein over two is represented by the fat and casein lost in the whey; therefore if we add a constant number (two, which represents the casein in milk), to the varying percentage of fat in the milk, as determined by the Babcock tester, we have a correct basis in which to work or, at least, one nearly correct, and to my mind a basis which comes nearest to giving justice to the patrons of cheese factories.

I wish to deny the reports which have been circulated that I do not believe in the accuracy of the Babcock tester, when properly made and handled. I go so far as to say that paying according to butter-fat alone is a much fairer way than by paying by weight of milk alone.

A STIRRING DEBATE.

Professor ROBERTSON: The Professor of Dairying at Guelph will permit me to remark that work of investigating the relation of the component parts of milk and cheese has been going on for several years, and that the foundations of our information have been well laid. It is true that the quantity of marketable cheese obtainable from milk containing different percentages of fat does not always vary exactly in proportion to the percentage of fat in the milk; but the actual market value of the cheese made from milk containing different percentages of fat does vary in proportion to the percentage of fat in the milk. When a method of paying for milk according to its real value was first suggested, it was necessary to shift the basis of payment from weight only of milk to value of milk. The value of milk can be ascertained by a knowledge of the weight and of the quality. It may be a slight advance on the old way to shift the basis of payment from weight of the milk, regardless of quality, to weight of cheese regardless of quality; but the latter is not a fair basis. A fair basis for valuation in cheese, as in milk, is arrived at only by taking into account weight and quality. The quality of the cheese, which determines its true market value, is modified by the percentage of fat in the milk from which it was made. Suppose you take two lots of milk, one containing three per cent. of fat and the other containing four per cent. of fat, no one will contend nowadays that it is fair to divide the proceeds from sales of cheese in such a way as to pay as much per hundred pounds for the three per cent. milk as for the four per cent. milk. The two lots may weigh exactly alike, but it is essential to fairness that the valuation or division of proceeds at a co-operative factory should be made according to actual value and not according to actual weight only. The long experience I have had in the making and marketing of cheese gives me some knowledge of the factors which determine the value of cheese per pound or per 100 pounds. We all know that the casein in the cheese is one of its most important constituents when considered as a food; but the chemical composition of cheese does not determine its value in the market so much as its flavour, richness of body and other physical qualities. Cheese, like other food products, has an intrinsic or food value and has also a commercial, exchange or market value. A pound of butter is not worth as much as a pound of cheese for nourishing the human body, but a pound of butter has a higher commercial or market value than a pound of cheese; and, all other things being equal, cheese has a higher commercial or market value in proportion to the percentage of butter-fat which it contains. In brief, according to our present conditions, a pound of butter-fat, when sold as butter or sold in cheese, is worth much more commercially than a pound of casein. To take an extreme illustration: If you take a piece of absolutely skimmed cheese without any fat in it at all, but with all the casein that can be retained, it would be worth little or nothing to the producer. It would take all the market value of it to pay the expense of making, boxing and marketing; and it would take the stomach of a rhinoceros to digest it. Fat as a food is not intrinsically of as great value as casein or other albuminoids; but the fat gives an additional food value, as well as increased commercial value, to the other food materials which may be in combination with it. The more fat you have in milk up to four per cent., the more nourishing, wholesome and valuable is the cheese made from it.

From experiments which I planned over four years ago for my assistants, Mr. Ruddick and Mr. Dillon, I found that the commercial or market value of cheese by the pound was increased according as the percentage of fat in the milk was higher, in milk containing between three and four per cent. of butter fat. In my report for 1891, I said:

"In ordinary cheese-making, where you have milk containing four per cent. of fat, you have reached the maximum limit, * * * and beyond that you do not increase the value of the cheese per pound." I also said in the same report "I think that the addition of each per cent. of fat to the milk between three and four per cent. will add five-eighths of a cent. per pound to the value of the cheese. The butter-fat in some measure adds to the value of the other constituents of milk. Let me put it in the following manner: A farmer sends milk containing three per cent. of butter fat to a cheese factory and gets so much money. Another farmer sends milk containing four per cent. of fat to the same factory. According to a scale which values milk for cheese-making according to its percentage of fat only, the latter will get one-third more money per 100 pounds of milk than the patron who furnished the three per cent. milk. I do not say that his milk will make one-third more cheese; but in my opinion it will have one-third more value in cheese-making when both the quantity of the cheese and its quality are considered."

What makes your September cheese worth more than the cheese of June make? Is it not largely because of the greater quantity of fat in the September milk? Doubtless, some of the difference is due to more favorable conditions of weather. In a discussion a little while ago, the question of the flavor of cheese came up. You may have cheese that is rich in both casein and fat, and yet the flavor may be bad and objectionable. You can hardly sell such a cheese. Germs of fermentation may have gone into the milk and by their growth have given it an objectionable flavor. Such germs often generate gas, as yeast makes the form of gas which causes the bread to rise; or they may generate by-products which will give their characteristic flavor to the cheese. The more butter-fat there is in milk and in the cheese made from it, the less risk is there of the cheese going off in flavor. The more moisture there is left in cheese, to make it rich in the body with a high percentage of butter-fat, the more danger is there of it going off in flavor. Consequently, the patron who sends to a factory milk rich in butter-fat, should get a higher price for it per 100 pounds than the one who sends milk poor in butter-fat, both because of the increased quantity of cheese the richer milk will yield and of the improved quality of the cheese which can be made from such milk. In the matter of the addition of two per cent. to the percentage of fat, as advocated by Prof. Dean, I may say that he has against his theory some of the strongest names known to dairymen. Prof. Van Slyke and Dr. Babcock, the latter a distinguised scientist whose name will live for centuries, and some of us who are less eminent are referred to by my young friend in one of his newspaper articles, because they do not agree with him in this matter, as "gods to the children of the south, and their worshippers in their native country and in Canada." Now, I do not say that the addition of two per cent. of fat to the reading of the Babcock tester may not be a better way of getting at a basis for the payment of milk according to its value for cheese-making than by the use of the readings of the Babcock milk tester alone. My friend, Prof. Dean, says it is a better way. I say, as yet we have no proof of the statement; but, as we have a large body of reliable evidence that the percentage of fat in milk gives an equitable basis for determining its value for making cheese, I regard the payment of milk and the distribution of the proceeds at the cheese factories, according to the quality of the milk as shown by the Babcock tester, as a safe plan; and I would not like the dairymen of the Province of Ontario or of Canada to be carried away by a little cheap puffing of a fad, or to be sent back to the old unfair method of valuing milk simply according to its weight, because doubt has been cast upon the usefulness of the Babcock milk tester by an agitation encouraged by the publication of immature and incomplete experimental data.

Prof. DEAN: I am glad to see that our friend the Dairy Commissioner has got warmed up at last. I would like to say that cheese-making has advanced since he was in the business, and that we are still learning something about it. We have been making rapid strides in cheese-making since he was a maker. He has said that I have been casting slights upon Dr. Babcock and Prof. Van Slyke. I had no idea of doing anything of the sort in what I have written regarding the connection of these gentlemen with the discussion arising from this scheme of adding two per cent. to the reading of the Babcock tester in cheese factories. When I advocated this addition of two per cent. last year some persons thought that it was going to do away with the trade that had been worked up for this tester. What I said about being a "little god" referred to the Babcock tester and some extravagant claims made for it, and not to the inventor. Prof. Robertson has gone to extreme lengths regarding the value of fat in the milk for cheese-making. A few years ago he claimed that as the fat increased one per cent. between three and four per cent. it added five-eighths of a cent a pound to the value of the cheese. Now, that is pure speculation—he cannot prove it. There are more things than the fat in the milk which decide the value of cheese made from it. I may say that there are a dozen or more factors, such as the flavor of the milk, the salting of the curd, and the color of the cheese, which are concerned in deciding the value of the cheese. There are a good many thing besides the chemical constituents of milk which enter into this question. The average percentage of fat in the milk of one of our best factories in Western Ontario is from 3 to 3.5 during the season, and they make fine cheese out of such milk. If you

use milk of four per cent. fat or over it seems to make curd which produces "pasty" cheese. Four per cent. and over of fat in milk is not necessary to make good Canadian Cheddar cheese.

Prof. ROBERTSON: It has been published for three years that experiments were conducted with over 300 boxes of cheese at the Dominion Experimental Dairy Stations, and the conclusions published in my report were based upon the facts found there and not upon theory. When an investigator gets behind all the facts of a case he can afford to smile encouragingly at anyone who assails them. Of course the value of cheese depends upon something more than the fat it contains; it is determined in some measure even by the rind and the boxing. The results of the experimental work at Guelph agree very closely with those at Perth in the quantity of cheese obtained from milk containing different percentages of fat.

Prof. DEAN: I would like to ask Prof. Robertson if he sold the cheese made out of rich milk at Perth for more than he got for the cheese made out of poorer milk?

Prof. ROBERTSON: No; we sold the lot as a whole, although there was a decided difference in the quality and value of the several cheese composing it.

Prof. DEAN: Well, we sold all ours for the same money, too; and "the proof of the pudding is in the eating."

Prof. ROBERTSON: It seems to me that patrons should get paid for what they contribute to the value of the cheese and not merely to the weight of the cheese; and that if one sends a superior quality of milk with a higher percentage of fat, he should be paid accordingly; and if any premium beyond the bare justice of payment according to value is to be given, it should be given to those supplying the rich milk of finest flavor.

Mr. FREE: Does washing curd help to get rid of the bad flavor?

Mr. PUBLOW: If I had a bad flavored curd, one full of holes or stinking, I would wash when it showed half an inch on the hot iron. I would mill the curd, level up and pour the water over it at 108°. I would have the water warm enough to raise the temperature at least 2° higher than I cook the curd to. I would keep it at that temperature for twenty minutes or half an hour, and stir it all the time it was in the water, and then strain it as when I would run off a batch of curd in the first place. I would use half a pound more of salt to the 1,000 pounds of milk than ordinarily. If I had sour milk curd that could not get cooked before it had too much acid, I would wash it, and would mill it when it showed "hairs" of one to one and a half inches on the hot iron. I would wash it under the same conditions as in the case of gassy curd. Stir it thoroughly dry after running the water off, and in an hour or an hour and a half salt it. I do not think there will be much, if any, loss in weight from the washing of the curd. The only thing you will lose will be the sour whey, which will run out white. I consider that the washed curd cheese we made this year were such as would sell for the best market price. It is the duty of every patron to have his milk in first-class condition. I would recommend that makers reject any milk that would not make a first-class cheese without washing.

A MEMBER: What about turnipy flavor?

Prof. ROBERTSON: I do not know any means by which the flavor imparted to cheese made from turnipy milk can be taken away.

Mr. WHITTON: What is the difference in feeding value between a bushel of ensilage and a bushel of turnips?

Prof. ROBERTSON: The two are hardly comparable. You might feed a cow upon ensilage alone, and she would live well; but she could not live well upon turnips. A bushel of turnips would be equal to, say two or two and a half bushels of ensilage as a supplementary food.

Mr. WHITTON: Now, if a bushel of ensilage is equal to two and a half bushels of turnips, why ask about how to get rid of turnipy flavor in milk? Get rid of the turnips as food for milking cows, or eat the turnips yourselves. Mr. Gould says we can build a silo for thirty cents per ton capacity. That will give us a cheap place for storing succulent corn. An acre of ensilage will feed two cows for a year.

THE MARKETING OF PERISHABLE FOOD PRODUCTS.

Professor ROBERTSON delivered an address on "The Marketing of Perishable Food Products," which, in substance, was similar to the one he delivered at the convention of the Dairymen's Association of Western Ontario at Woodstock.

SOME LESSONS FROM A TRIP TO EUROPE.

Prof. DEAN made the following closing address: During the past summer I was allowed eight weeks' holidays, in order to visit some of the dairy countries of Europe. The marketing of our dairy products is something that comes more particularly within the domain of the Dominion Government, while the work of the Provincial Government is chiefly along the line of teaching. I went abroad largely to fit myself to be able to more thoroughly instruct the students in dairying who from time to time come under my charge. I must say that as a Canadian I felt proud when going about among the commission men and dealers in Liverpool and Glasgow to hear them assure me that most of the Canadian cheese was all right. I was told, however, by one dealer that our spring cheese does not contain quite enough moisture for a quick trade. Since coming home I have been told the same thing by one of our buyers. I was also told when in Great Britain that there was room for improvement in our mode of boxing. Our boxes are not as good or as suitable as they should be. I was humiliated to see a good many of our boxes tied up with ropes. I would also say here that there is not that distinction made between Canadian and American cheese that our cheese is entitled to. Better boxes and better handling is necessary if we are to hold our place at the head of the British cheese trade. I went over on the Dominion Line steamer Labrador. At Quebec they put on board several thousand boxes of cheese. They slid the cheese boxes down the gangway on a plank. Sometimes the covers flew off, and sometimes the scale-boards also came off, and, while the covers were put on again, I never saw a scale-board replaced. I remember that when sending cheese from Guelph to Woodstock I found that some of them were badly broken. The express companies deserve to be blown up—that is, figuratively speaking. I was told by commission men when in England that they would like to count on a regular supply of cheese and butter. We are making a mistake in the way we market our butter, and there seems to be a tendency to market cheese in a similar manner. In Denmark they ship the butter once a week, and arrangements are now being made by the authorities to ship twice a week. If we are to successfully cultivate the butter trade of Great Britain, we must make some arrangements by which we can ship our product regularly and as soon as possible after it is made.

Prof. ROBERTSON: Butter is usually about six cents higher from September to May.

Prof. DEAN: I am satisfied that in the future it will be more difficult than ever to sell an inferior quality of cheese or butter. We can keep the British market only by making first-class cheese and butter. I would like to impress upon the patrons here to-day, more than ever before, the importance of furnishing good milk to our makers all the time.

What kind of butter is desired in the British market? I was in a large warehouse in Liverpool, and I asked if I might be allowed to bore a sample of Canadian butter which was standing there. I must confess that when I did try that butter I was ashamed of the quality. I think we can, and do, make as good butter as they do in Denmark, but we make the mistake of keeping it too long. I have visited Canadian creameries and have found the butter made there of the finest flavor. But no matter how excellent the flavor may be, if it be placed in a warm room for any length of time, that butter will go off flavor. The requisites in butter are that it must be mild, fresh, pleasant and sweet in flavor. I have found, too, that Canadian butter is too high in color as a rule for the English market, and it is also too high in salt. About

three to five per cent. of salt is the right proportion for this trade—that is, about half an ounce of salt to a pound of butter. We have been teaching our students to put an ounce of salt to the pound, but we must make it less for the best British trade. When I went to Manchester I found that as a rule the Danish butter lacked what we call a good body, but, if it suits the Englishmen, we shall have to study their tastes and wants. Now, a word about the package. One of the great faults complained of in our butter is that it has a woody flavor. Some package must be devised that will not impart that woody flavor to the butter. I believe that square boxes are most popular as packages next to the Danish kiel. Had I time I would like to point out how the Danes have overcome the defects in their butter.

I would like to add a little about bacon. While in one of the large British warehouses a load of Danish bacon came in. The manager told me that while some of our Canadian bacon was good, some of it could not be sold at a paying price. We need to send a bacon in which the fat is solid, the lean mellow, and that has no salt on the outside. I think that the quality of the Danish bacon is due largely to the kind of hogs raised and to the feed. One farmer whom I visited on the island of Zealand was fattening his hogs last summer with green clover and meal. I think the feeding of clover has a good deal to do with this mellowness in the lean meat of the Danish bacon. The pigs are graded at the slaughter houses. A farmer with whom I stayed a couple of days pointed to a pig among a lot which were being sent to the slaughter house, and said: "There is a pig that will grade only No. 2." I asked him why, and he answered: "Because he is too broad and fat." Their No. 1 hogs are what we would call in this country about half fat. The bacon is put up in a nice linen cover, and is well-protected from dirt.

I think we should have a distinct Canadian package for all our first-class dairy products. In the eyes of a Britisher all that is associated with a good name is connected with the package in which he buys his goods. I believe that if we had a good package for our cheese, butter and bacon, which was distinct from all other packages, and at the same time made up a good, uniform article, it would be thousands of dollars of gain to this country annually. I think we ought to have butter exhibitions, like they do in Denmark. They have about twenty of these exhibitions every year in that country. The chemical division of the Experiment Station at Copenhagen call in a number of experts who test the butter obtained from creameries and dairies—three sets of judges make the examination and each set goes over the butter once—three times in all. The butter is scored by the judges, and the results are sent back to the maker.

I think it is possible to develop a trade in tinned butter. The Danes do a large business in that line. I believe that there is also a good opening for a large business in condensed milk. We import $25,000 of fancy cheese for our city markets. I do not see why we cannot make that fancy cheese at home I did not see a Cheddar cheese exposed for sale on the continent of Europe. They handle fancy cheese which workingmen can hardly afford to buy. I regret that the lateness of the hour will not permit me to point out some more of the interesting and suggestive facts noticed by me in the dairy countries of Europe.

IN MEMORIAM.

A resolution of condolence was passed to the surviving relatives of the late J. B. Harris. His wise and helpful services to Canadian dairying the past were referred to in eulogistic terms by Mr. Whitton and Prof. Robertson.

After a few hearty words from Messrs. Smith and Owens, of Campbellford, and cordial thanks to these gentlemen for their splendid work in assisting the Association, the convention adjourned.

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

OFFICERS FOR 1896.

Honorary President	THOMAS BALLANTYNE, Stratford.
President	A. F. MCLAREN, Stratford.
1st Vice-President	JOHN. S. PEARCE, London.
2nd Vice-President	HARCLD EAGLE, Attercliffe Station.
Directors:	
Division No. 7	JOHN PRAIN, Harriston.
Division No. 8	J. N. PAGET, Canboro'.
Division No. 9	ANDREW PATTULLO, Woodstock.
Division No. 10	THOS. GIBSON, Fordwich.
Division No. 11	R. M. BALLANTYNE, Stratford.
Division No. 12	J. W. SYMINGTON, Camlachie.
Division No. 13	H. WHITE, Hawkesville.
Secretary-Treasurer	J. W. WHEATON, London.
Inspector and Instructor	T. B. MILLAR, London.
Auditors	J. A. NELLES, London. JOHN GEARY, London.
Representative to the Industrial Fair, Toronto.	J. W. WHEATON, London.
Representatives to the Western Fair, London,	JOHN GILMOUR, Nilestown. ROBT. ROBERTSON, London.

NINETEENTH ANNUAL CONVENTION

OF THE

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

To the Honorable the Minister of Agriculture :

SIR,—I have the honor to submit herewith the nineteenth annual report of the operations of the Dairymen's Association of Western Ontario.

The season of 1895 will be remembered as a most trying one for dairymen. The price of cheese was about one and one-half cents per pound less than in 1894, which would mean a loss of about $750,000 to the dairymen of Western Ontario. The season was also characterized by a severe drouth in many sections, which materially affected the flow of milk, and caused many of the smaller factories to quit operations before the season was much more than half through.

Included in the report for 1895 are detailed accounts of the Directors, Secretary, and Inspector's work, which, together with the annual address of the President, give the operations of the Association during the year, and the condition of dairying in Western Ontario during the same period. They show that winter dairying is being continued by all the factories, which commenced that branch a few years ago, and that the number of cheese factories making butter during the winter is increasing; that there is need of more uniformity in the quality of western cheese and of more uniform methods of instruction and inspection than have been carried on heretofore. The number of persons prosecuted for tampering with milk is shown to be larger than in 1894, thus furnishing a proof of the necessity of paying for milk for cheese-making by the butter-fat system. One of the difficult problems in our factory system is shown to be returning the sour whey to the patrons in the milk cans, and the best plan of conducting the selling of cheese at the various dairy boards of trade is given considerable attention. These reports also show that very effective work was done by the Association in educating dairymen and farmers by a number of successful local conventions and meetings held during the year.

The nineteenth annual convention of the Association was held in the town of Woodstock on January 7th, 8th and 9th, 1896. Though the interest in dairy matters, owing to the low prices, had declined somewhat, the attendance at this gathering was far in excess of other years. In fact, it may be safely claimed for this convention that it was

the largest and most influential gathering of dairymen ever held in Canada. The addresses were practical, covering nearly every phase of dairying. A *verbatim* report of these addresses is included herewith, and the discussions upon them given in full.

The continued recognition of the Association's good work by your Department during the year, in making liberal grants to meet the heavy expenditures which such work must entail, merits the sincere thanks of its directors and members. In anticipation of your continued good favor it will be the aim of the Directors and officers of the Association to expend, as heretofore, all future grants in the best interests of dairying in Western Ontario.

All of which is respectfully submittted.

J. W. WHEATON,
Secretary.

LONDON, Ont., February 15th, 1896.

NINETEENTH ANNUAL CONVENTION

OF THE

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

WOODSTOCK, January 7th, 1896.

The President took the chair at half-past one, and after a few introductory remarks expressing the hope that the convention would be one of the most successful yet held, he called upon the Secretary to read the annual report of the Directors, which was as follows:

DIRECTORS' REPORT.

GENTLEMEN,—Your Directors for 1895 beg to report as follows: During the past year we have endeavored to carry on the varied work of the Association in our charge with vigor and efficiency. But in spite of our earnest efforts and united desire to further the interests of the dairy industry to the utmost extent, there is some work unfinished, and much that requires to be done during the coming year. And here we might state that the executive work of the Directors is, like the number of cheese factories and the variety of interests connected with the dairy, increasing year by year.

We had early in the season a circular sent out to factorymen outlining the policy and work of the Board for the year, which seems to have had a beneficial result. The usual work has been done by the Secretary and officers of the Association in attending meetings of dairymen.

The stimulating effect of local conventions held under the auspices of the Board continues to be apparent. The results are such as to warrant a continuation of this means of educating patrons in districts that do not come so directly under the influence of these large conventions. The demand for such district meetings has been such that we have not in every case been able to acceed to requests made upon us for them. During the past year most successful gatherings were held at Strathroy, St. Thomas, Simcoe, Kincardine, Harriston, Flesherton and Newmarket. These names suggest the extent of the operations of this Association and the demands made upon its activity. Your Board has received valuable assistance from local dairymen in making these meetings successful, and also from the Superintendent of Farmers' Institutes in the way of speakers. In addition to the talent ordinarily available your Board were fortunate in securing the services of Mr. J. H. Monrad, a well-known authority on dairying.

We have also continued the system of special instruction through Mr. T. B. Millar, during the early part of the season before the regular work of inspection begins, as during the previous year, and with good results. He spent two days each with no less than twenty-seven factories so located as to be within easy distance of almost every cheese factory in western Ontario.

During the hot season there was an increased demand for inspection and special instruction, a demand which the Board for 1896 should endeavor to provide for. In this connection we would urge upon your attention the fact that the work of inspection and instruction is now perhaps the most important that your directors have to deal with. And we would suggest that this convention should give some indication of the feelings of factorymen on the subject. We are of opinion that the whole of Western Ontario

should be organized into districts or groups of factories, over which competent inspectors should be placed. This can only be done through the co-operation of factories with the Board of Directors of this Association. We urgently press this subject on your attention. A committee of the Board had the subject under consideration for some time past, but a solution has not yet been arrived at. It will have to be dealt with by the new Board for 1896.

We beg to report that the usual grant of $100 was made to the Western Fair, also a grant of $50 to the Industrial, and a new grant of $50 to a dairy department inaugurated in connection with the Provincial Fat Stock Show at Guelph. This latter amount was in conjunction with a like amount from the Agriculture and Arts Association, and with donations from private individuals, including your President and Secretary. A test of dairy cows was held in connection with the Guelph show.

During the Industrial Fair a joint meeting of your directors with the directors of the Dairymen's Association of Eastern Ontario and of the Ontario Creameries' Association was held in Toronto. It was there proposed by members of your Board that the latter body should re-unite with the two Dairymen's Associations, it being generally felt that the three associations are now doing almost identically similar work. But, although the suggestion was discussed at length, no agreement was arrived at.

This meeting of the representatives of the three Associations was opportune, as a report had just been circulated by a prominent agricultural journal in Britain to the effect that adulterated Canadian cheese was being sold in the English market. A strong denial of this absurd and false rumor (since apologized for by the journal in question) was drawn up as follows:

"Moved by Mr. Thos. Ballantyne, Stratford, and seconded by Mr. E. Kidd, North Gower, President of the Eastern Dairymen's Association, that the Directors of the Ontario Creameries' Association and the Eastern and Western Dairymen's Associations, in joint meeting assembled, having read the report in the press that adulterated cheese from Canada has been sold on the British market, take this opportunity of denying emphatically that any adulterated cheese is manufactured in Canada, and of declaring that we know the said report to be wholly without foundation. This meeting expresses its regret that such an untruthful report spread abroad to work serious injury to the cheese trade of this country, should have been circulated, and hereby requests that copies of this resolution be transmitted to the Minister of Agriculture at Ottawa, to the High Commissioner at London, and to the Dairy Commissioner for Canada."

The wide publication of such a resolution, coming from the official representatives of the three dairy organizations of the country, no doubt had the desired effect of preventing misapprehension where your interests might be injuriously affected.

The statement of the financial affairs of the Association will be laid before you by our Treasurer, from which you will find, we believe, that the business of the year has been carried on efficiently, as well as with as great regard for economy as the varied work and interests of the Association would permit.

We regret to say of the past season that it has been one of great difficulty and discouragement, both to patrons, to makers and to dealers engaged in the trade. Low prices, hot weather, lack of fodder, and bad water combined to increase the difficulties and lessen the profits of the business. In this connection we have still to deplore the custom, far too prevalent, of sending back whey in the milk cans, a custom which this convention should endeavor to devise some means of doing away with; also, the fact that the system of paying for milk according to quality, as shown by the Babcock tester, has not yet been universally adopted.

We have here touched briefly on a few of the salient features of the work of the Board for the past year. In conclusion, we beg to say that we have endeavored to provide as excellent a programme for this convention as possible, and trust that it will be as successful as any in the past, and that the dairy industry during 1896 will be more prosperous than in the season which is now closed.

Wishing you a happy and prosperous New Year,

We remain, on behalf of your Board of Directors for 1895,

ANDREW PATTULLO,
President.

J. W. WHEATON,
Secretary.

SECRETARY'S REPORT.

GENTLEMEN,—I have much pleasure as your Secretary in presenting my report for the year 1895.

The year has been characterized by the usual vigor on the part of the Association and its officers in carrying on the work. The various branches of the work have been made as effective as possible in promoting the welfare of the dairy industry in Western Ontario.

The number of annual and local dairy meetings attended was not so large as the year previous. The larger number of local conventions held served, in a measure, to lessen the need for smaller gatherings; besides, the constantly increasing duties in connection with the office work of the Association prevented attendance at several meetings. The low prices of the past season having dampened dairy enthusiasm considerably, there was not the usual demand for attendance at meetings last fall. There is still, however, a demand for attendance at annual meetings, and several requests have been received recently for some one to address the patrons.

Local and annual meetings were addressed at the following places during the year: Walsh, St. Williams, Vittoria, Kintore, Alberton, York, Canboro, Rockford, Villa Nova, Bothwell (two meetings), Glencoe and Embro, where a meeting of factory representatives was held in November. Besides, addresses were given at the annual conventions of sister Associations in the Province, at the local convention and two addresses at Farmers' Institute meetings during March. A word in regard to the advisability of continuing this line of work. It is claimed that as the cheese industry has been sufficiently developed there is no further need for continuing this work. I heartily concur with the first part of this claim, and am thoroughly of the opinion that the cheese industry of this Province, and in fact of the whole Dominion, has been sufficiently "boomed," and that it would be a serious mistake on the part of the Association to make any extra effort to extend this industry or to increase the annual output of cheese. Special attention should, however, be given to keeping up the quality, and this can only be done by every one connected with the industry doing his best. The patron should be educated as to the proper care and handling of milk for cheese making; the best means of disposing of the sour whey; the butter-fat system of paying for milk; and several other important features of dairying, and one of the best means of bringing this about is by reaching him at annual or local meetings. For this reason I think the holding of local meetings should be encouraged in the districts where factories are in operation.

Seven successful local conventions were held at Strathroy, St. Thomas, Simcoe, Kincardine, Harriston, Flesherton and Newmarket. Invitations for local conventions were also received from Walkerton and Elmira. These meetings were held as early in February as circumstances would allow, but, unfortunately for the northern dairymen, the snow blockade came, rendering the roads in many places almost impassable. In fact the Kincardine meeting had to be postponed because the speakers could not get within thirty miles of it by rail, and some of us who attended the postponed meeting have a vivid remembrance of a thirty mile ride over drifts and pitch holes to catch a train that we didn't catch. The attendance at all these meetings, however, was an improvement on that of former years.

Owing to the difficulty of securing competent speakers here who would be available to address these gatherings, Mr. J. H. Monrad, of Illinois, was engaged to address the seven meetings. The wide practical experience of Mr. Monrad in dairying in Denmark, New Zealand and America made his addresses of special value to the dairymen who were privileged to hear them. The Association is indebted to the Superintendent of Farmers' Institutes for the Province who arranged for Prof. Harcourt to address these local gatherings. His addresses were also of much value from a dairyman's standpoint. Others who rendered valuable services at some of these meetings were the President of the Association, Prof. Dean, J. S. Pearce, A. F. McLaren, Wm. Dickson, W. O. Shearer, T. E. Young, D. Leitch and Harold Eagle. Considerable interest was taken in these meet-

ings by the local dairymen and citizens of the towns in which they were held, who in every case assumed the responsibility of advertising. The holding of local conventions might to a certain extent be continued for the same reason that local meetings should be held.

Two visits were made to factories to inspect milk where the inspector could not attend. Assistance was rendered at one factory where the paying by test had been adopted for the first time. A number of other factories were visited during the season when opportunity would allow, and where no extra expense would be incurred.

The office work of the Association is every year increasing, and the correspondence is becoming a most important part of it. During the year, 862 letters were received, and as many written in reply to these, and in connection with the Association's work. There have been more letters received asking for information on some practical feature of dairying. This is a phase of the work that should be encouraged, as it will be the means of making the Association of more practical benefit to dairymen.

Early in the year I received instructions from the Directors to purchase a Mimeograph for use in the office. This has proved to be a profitable investment, and already about enough has been saved in the cost of printing to pay for it. It was particularly valuable in connection with newspaper work. Some twenty different articles were written, giving reports of Directors' and Executive meetings, notes on the Association work and some practical features of dairying. From fifty to sixty copies of each article were run off and mailed to as many local papers circulating in the dairy districts. These articles as far as we can make out were published in nearly every case by the paper to which they were sent, and served to bring matters of importance before dairymen, and to keep the Association and its work before the public in a manner that could not otherwise have been done. At the beginning of the season 1,000 four-page circulars, setting forth the work to be carried on during the cheese season, were mailed to the makers, salesmen of factories and members of the Association. Six thousand programmes, containing thirty-two pages, were issued at the beginning of the year to advertise the Stratford convention. Enough funds were secured from advertisements to pay the cost of printing and distributing. Six hundred invitation circulars were sent to the dairymen in December inviting them to be present at this convention.

In answer to a number of questions sent out to factory men, 113 replies were received. From these a lot of valuable information of a more or less statistical nature was secured, and we have taken the trouble to compile it in this report.

These returns show an average of over eighty-three patrons and 526 cows for each factory, which is considerably higher than last year. This would be an average of over six cows to each patron, and if 350 be taken as the number of factories, there would be a total of 29,050 patrons supplying the milk of 184,100 cows to the cheese factories of Western Ontario, a considerable increase over the previous year. The largest amount of money received by any patron per cow for the season of 1894 was $65 and the lowest $6, the average being $23.34, which was $2.51 per cow less than in 1893. The amount of money any patron receives per cow depends in some measure upon the length of time the factories run and the cost of running. At the factory to which the $65 per cow man sent, the smallest amount received was $27 per cow, and where the $6 per cow man sent, the largest amount received per cow was $30.04. If 184,100 be taken as the number of cows, the estimated value to patrons of the cheese made in 1894 in the district looked after by this Association, would be $4,296,894. The average price paid per 100 pounds of milk to patrons in 1894 was 73.63 cents, ranging from ninety to sixty cents per 100 pounds. The average number of pounds of milk to make one pound of cheese was 10.76, varying from 11.45 to 10.18. There was an average of sixty-one and a quarter tons of cheese made in each factory, ranging from nine to 245 tons, and taking 350 as the number of factories, would make a total of 42,875,000 pounds of cheese made in Western Ontario in 1894.

The average price paid to cheese-makers per 100 pounds of cheese for making last season, all furnishings included was 80.64 cents, ranging from 70 to 92 cents, and where

boxes were not supplied the average was 62.44 cents, varying from 70 to 55 cents per 100 pounds of cheese; the average where only labor was supplied was 38.75 cents per 100 pounds of cheese and $43.25 per month. The cost of manufacturing to patrons, including milk hauling, averaged $1.99 per 100 pounds cheese, varying from $1.15 to $2.50, and the average cost where milk was delivered ranged from 95 cents to $1.50 per 100 pounds cheese and averaged $1.11. The average cost of hauling milk was 7.6, varying from 3.3 to 12 cents per 100 pounds.

The data obtained referring to the butter-fat system of paying for milk are somewhat similar to those given in last year's report. There was a falling off in the number of factories using the test last year. This reduction was due to various causes, one of the important reasons being that the patrons at many factories did not wish to pay anything extra for testing, and as the maker in many cases did not feel disposed to do the work for nothing, the test was discontinued. Though it is nothing but just that if the maker has any extra duties to perform he should receive more pay, yet I am of the opinion that it will pay the maker to do the work for nothing rather than have the system discontinued, as it will insure him a better quality of milk delivered at the factory. There are other reasons that might be given why the butter-fat system has been discarded at many factories, but as these will probably be discussed at a later part of the convention I will not discuss them here.

Paying by test has not been agitated very much during the past year among dairymen, and consequently many of them have come to the conclusion that the thing is a kind of "dead letter." But such is not the case. Too many have made the mistake of expecting from its adoption absolute justice. It should, however, be considered in a relative sense only. When we compare it with the "pooling" system there can be no question but that the butter-fat system is more nearly in accordance with justice. The returns from the factories show that the average number of pounds of milk to make a pound of cheese in 1894 at the factories where the test was in operation was 10.703, while the average at the factories where the pooling was used was 10.817. These figures furnish a strong argument as to the effect the system has in keeping up the quality of the milk. There was during the year a large demand for inspection of milk at the factories and some of the applications were from factories where the test system had been discarded. If the discontinuing of the system makes it necessary to call in the inspector, another strong argument is furnished why paying by quality should be adopted in every factory.

The butter-fat system of paying for milk for cheese-making is one of the most important questions before dairymen to-day, and I would ask everyone connected with the industry, and especially patrons and factory managers, to consider the system carefully as to its power to bring about the following:

(1) A richer quality of milk.

(2) A better flavored quality of milk.

(3) To remove the temptation to add water or to take the cream off milk supplied to cheese-factories.

(4) To render to each patron more nearly the actual value of his milk than the old "pooling" system.

(5) To put the apportioning of dividends at cheese factories on a sounder and more accurate basis.

These returns also show that 77 per cent. of the factories return the sour whey to the patrons in the milk cans; that 15 per cent. do not return any whey; and that 8 per cent. partially return it. If the practice is detrimental to the making of really fine cheese these figures show that the bulk of the factories in Western Ontario are far from having the most perfect methods of carrying on the business. The average price received for whey sold at the factories was $4.13 per ton of cheese, ranging from $2.75 to $6.40 and 85 cents for the whey from a standard of milk varying from 35 cents to $1.75. At these figures, everything considered, patrons will receive as much if not more value than in having the sour whey returned and will not run the risk of having the cheese injured by

the sour whey flavour. Where the whey is not returned, everything considered, the cost of hauling milk is less. The average cost of hauling at the factories where the whey was not returned was 6 3-5 cents per 100 pounds of milk, while the average cost where the whey was returned was 8 3-10 cents, a difference of nearly 2 cents per 100 pounds, or about 25 per cent. less.

From these returns it is also found that the average length of time the factories were in operation in 1894 was 6¼ months, ranging from 3½ to 12 months. The factories running all the year made butter during the winter. The average length of the milking season for the patrons was about 8 1-5 months, varying from 6 to 11 months. These returns also show that at only about 86 per cent. of the factories was supplementary feed provided for cows during the summer, and at only a very small percentage of these factories was such feed grown by all the patrons. The kind of feed grown for this purpose was chiefly oats and peas in the earlier part of the season and corn later on.

The value of factories' building varies from $200 to $6,500, showing an average of $2,070. Taking 350 as the number of factories, this would give a total value of $724,500 to the cheese factory buildings under the jurisdiction of this Association. About 48 per cent. of the factories are owned by private persons and about 52 per cent. owned and operated by the patrons.

The number of factories that applied for and received visits from the inspector was not as large as in 1894. There was, however, a larger percentage of applications for milk inspection only. In fact for a week or two during the very dry weather there was such a rush of applications for the inspector that several men might have been employed to do nothing but look up and prosecute patrons for skimming or watering milk. Though it is nothing but right that patrons guilty of tampering with milk should be punished, yet it would be better for the factories concerned, better for the patrons and bettter for this Association if all milk for cheese-making were paid for according to its quality. In fact, since there is at the disposal of every cheese-factory a practical and just method of paying for milk according to its quality, I am somewhat of the opinion that this Association would be justified in refusing to inspect milk at all, and in limiting the work of its inspectors to giving instruction in cheese-making only. If this were done, there is no doubt that more factories would be compelled to adopt the test system, and the efforts of the Association could be directed more to keeping up the quality of the cheese.

This leads me to the question of having a standard quality in our Western cheese. There are factories in our district which make us fine quality of cheese during the season as is made in Canada, but there are other factories where the quality of the cheese made is far below that of the best factories. These inferior goods in many of our factories injure the sale of the superior goods of our best factories. If all the cheese made in Western Ontario were of a superior uniform quality throughout, better prices would obtain. Therefore I think that the efforts of this Association and of every dairyman in this western district should be directed during the next few years to bringing this about.

This question is now being considered by your Directors, but as I have been giving the matter considerable personal attention during the past few months I will take this opportunity of presenting to you what I consider to be the most practical means of bringing about a greater uniformity. To secure a uniform product there must be uniform instruction and uniform methods of making. There are, as already stated, about 350 factories in Western Ontario. If these factories were arranged in groups or syndicates of from twenty-five to thirty each, and a competent instructor placed over each syndicate to visit each factory regularly, say once a month, and if a well-equipped instructor or inspector-general were employed to look after the syndicate instructors and be responsible to the Association for their work, we would have a feasible and comprehensive scheme for bringing about a more uniform product. To finance such a scheme would require more funds than the Association has at its disposal, and unless the factories would co-operate and contribute to its support, it could not be put in practice. It has been suggested by a person interested and thoroughly competent to judge, that if the factories would contribute enough to pay the salary and expenses of the syndicate instructors the Association should

pay all expenses connected with the inspector-general, with organizing the syndicates, with managing the finances of the whole scheme, and become responsible for the men employed throughout. This, I think, would be a fair division, and all that the factories would have to do would be to pay into the treasury of the Association their share, or become responsible to the Association for it.

It is somewhat difficult to give an accurate estimate of what the factories would have to pay. A safe estimate I think would be about an average of $25 a factory, which is not a very large amount considering the benefits to be derived from the investment. This rate would give about $8,000. But it would not be just to tax every factory alike. A rate levied upon the quantity of cheese made would be fairer. By taking our estimate as above of the quantity of cheese made in Western Ontario and striking a rate of forty cents per ton, it would supply sufficient funds to carry on this work, but it would have to be modified by making a sliding scale of prices according to the size of the factory. If all the patrons of cheese factories looked after by this Association were to become members of it we would have an annual revenue of over $14,000 from this source alone, and this would only mean fifty cents apiece; or if every patron would pay in twenty-five cents there would be an annual revenue of over $7,000, which would enable this syndicate scheme to be carried out by the Association. This is in brief the outline of a scheme for more uniformity in cheese production; and if any such scheme is contemplated it should be under the entire control and management of some central organization. It would defeat the object in view to have independent syndicates formed, as there would be only local uniformity, and what we want is uniformity of product throughout Western Ontario.

It would not be possible to carry out such a scheme as this in its entirety all at once, as the patrons would need to be educated to it; but a beginning might be made by organizing one or two syndicates on trial for next season, of factories that could be induced to go into it, and if the plan were successful, others would soon fall into line.

The syndicate system of instruction is largely developed in Quebec, and is the reason why that Province is so rapidly coming to the front with respect to the quality of its cheese. In 1893 there were twenty-eight syndicates in Quebec. Each syndicate has its own instructor, and there are two general-inspectors who look after them. The estimated cost for syndicate instructors (salary and expenses) ranged from $475 to $600 for the season. The cost here would probably be higher. The Quebec Government makes a grant to each syndicate not to exceed $250 per annum, so that the factories in a syndicate would have to pay about $300 all told. The Dairy Association of the Province also receives a grant towards paying for head inspectors. Each syndicate manages its own finances and pays its own instructor, who is looked after by the Government or Association instructor or inspector. It would, I think, be better to have all the syndicates managed and controlled by one central organization, and this Association seems to be well equipped at present for undertaking such work if the factories would agree to pay their share of the necessary funds. Gigantic as such a scheme may appear at first sight, it furnishes a means by which the efforts of this Association and the efforts of our dairymen may be turned to practical account in improving and bringing about a greater uniformity in the quality of the cheese made in this part of the Province.

The membership of the Association last year was 468. This is a decrease of 126 as compared with the previous year, and may be accounted for from the fact that the number who joined at the Stratford convention was just 100 less than the number who became members at the Ingersoll gathering the previous year, though the attendance at the former gathering was somewhat larger. Besides, as there were not so many meetings attended, there was not as great an opportunity for securing members. If all those who have become members since I became connected with the Association would continue their membership every year, there would be now a membership of about 2,000. There are only about 150 who can be relied upon to continue their membership from year to year. This is a very small percentage of those whose duty it is to become members. Last year I took the trouble to send out a post card to the members for 1894 who had not joined in 1895, requesting them to send in their membership fee for last year. From over 300

reminders sent out, only fifteen responses were received enclosing membership fees for 1895. From this it will be seen how difficult it is to keep up the membership of the Association without coming in contact with the dairymen, and even then it is difficult to get members.

A list of cheese makers in western Ontario is kept on file, with addresses corrected as far as possible up to date. This list contained 293 names last year. There are still a number of makers whose names are not on this list whom we have not been able to locate definitely. All those who think they are not on will confer a favor by sending in their names and addresses, as it is important that the list should be as complete as possible. Whenever an address is changed we shall deem it a favor if makers will notify us.

There are a few minor matters connected with the Association's work that might be considered with profit here, but as this report is already too long I will not occupy any more of your time.

Again thanking the Directors and members of the Executive for their continued kindness during another year, I am,

Your obedient servant,

J. W. WHEATON, Secretary.

Mr. JOHN BLAYNEY: There is no doubt in my mind that the system of paying for milk by the Babcock tester is a right one. The great trouble is to put it into force. I am going to say a few words from the patron standpoint. It is a well known fact to all men who have been engaged in the cheese business for the last year, that the profits to the patrons have been very small, and in some cases nothing at all. Here comes the difficulty. If the cost at the cheese factories is to be borne by the patrons principally, and the patrons realize no more for the raw material at the factory, it is a question to be reasoned out by the patrons which is the greate evil—the pooling system with a few dishonest patrons, or the Babcock system with the extra expense thrown upon the patron? It is a question to be reasoned out, I say, which of the systems would give to the honest patron the most money. As far as I am individually concerned I would not object to a trifle more expense under the Babcock system, but I am only an individual. We had the matter discussed at the cheese factory that I supply milk to, and I found that a large number of patrons were very much afraid of the Babcock system. I have always taken it for granted that the honest patron need not be afraid of any system that would give to all men what they really should have, and no more. There is no doubt in my mind at all that if the patrons become satisfied that they gain nothing at all by sending dishonest milk to the factory that they will very soon cease to do so. There is another thing I noticed, and that is the necessity of improving the quality of cheese. I believe it is in the interests of the patron that every factory should turn out the best possible article. As we largely depend on the export market, and all men who know anything about the export market know that it is the finer qualities that secure the price, I consider all men who are in any way interested in the cheese business are in the same boat. We should all aim to furnish the cheese maker with the best possible milk, and then, of course, we shall expect him to make first-class cheese.

PRESIDENT'S ADDRESS.

Mr. Andrew PATTULLO, President of the Association, gave the following address:

I would just ask your permission to take the opportunity of reading a few of the observations that I have to make to you in order thereby to be a little more brief and concise than perhaps I would be if I spoke as I usually do on public matters. In the first place I regret very much that I have to remind you that the past season has been an unusual one in the cheese industry. It has been, in fact, one of the most trying, if not the very worst, both for producer and dealer in the whole history of the trade. I propose

in the few observations which I shall address to you to-day to make some quotations from my remarks of last year at Stratford, because nearly everything said on that occasion has quite as much force applied to present conditions as it had then. In our discussion of practical topics, the addresses and papers given are of necessity very largely a repetition of old truths, sometimes in new and improved form. But this fact does not render their repetition the less important or necessary. And so with all the lessons which we must draw from experience. They cannot be repeated too often until they are learned and acted upon. Last year I said :

"It can be claimed for the dairy industry that since it became of importance to the country, the price of cheese has, with the possible exception of a single year, afforded a margin of profit to the producer, while the average of profit has been extremely good. This is a remarkable fact, during a period when nearly every other product of the farm has fluctuated in value, if it has not become permanently low."

I fear that this statement, so gratifying then, can no longer be repeated. If the price of cheese has not fallen below the point of profit, it has come so near it as to make the situation serious. In newer districts and in those not specially adapted to cheese making, profits have probably been turned into positive losses. This at least seems to be the opinion of many producers who have either made the past a short season or gone out of the business altogether. The cause of this unusual condition of affairs deserves your serious attention and study. Some of them are clearly beyond your control ; others are home-made and so obvious that their lesson is easily learned. Three years ago at a meeting of dairymen in this county, almost as large as this convention is likely to be, I ventured to warn you of the danger of over-production, urging that all our efforts in this country should be directed to improvement in quality and not to the extension of cheese making into new and enlarged areas. Men eminent in the industry then thought otherwise. Last year at Stratford I also took occasion to say :

"It is just possible that the usual interest—not quite yet a craze—excited in this and other countries by the success of our dairymen may lead to an expansion of the industry to the point of danger ; and that from influences already in motion here and elsewhere we may see a marked fall in the price of cheese as in other products of the farm—a contingency which our dairymen should not lose sight of. However this may be, it is clear that all our efforts, especially all governmental efforts, should now be directed to raising the standard of quality, to the holding and improvement of the position we already have in the markets of the world, rather than to an extension of the area of cheese-making operations.

The danger has come sooner even than anticipated. We are now suffering from over-production. The world is making more cheese than our solitary market, Great Britain, will consume at such prices as have prevailed in the past. Still, we have been using the resources of the country to force production in many directions And in this connection it is worth reminding you that the situation might have been much worse. It would have been, for instance, if United States exports of cheese had continued normal instead of declining. Then again the production of cheese in the Antipodes has suffered a check through more than usually severe drouths. These two dangers have thus been minimized during the past year. But still we have suffered and found profits vanishing for the first time in almost a generation. We too have suffered a check and have got to low prices which may continue. The lesson is obvious. Let expansion cease, and let all our efforts, official and other, be directed solely to the improvement of quality. We cannot change outside conditions. We can neither stop production abroad nor raise prices in Great Britain. But we can defeat competition by superior quality—and thus minimize, if not remove, the effects of increased or over-production.

Some other advice given you last year seems also to be even more important than it was then. I refer to the obvious advantages of selling cheese at our markets promptly when ready to ship. The experience of last year, as of the year before—and, indeed, of almost every year in the history of the trade—proves that by following this rule the producer will be the gainer, and that all the interests of the trade will be promoted. Failure on the part of salesmen to act on so obviously a common sense policy has had an injurious effect on our markets, while it has frequently caused serious loss to the producer. The fact is that the "Call Board" system is becoming something like a farce. What are called our cheese markets seem to exist no longer for the sale of cheese, but to avoid their public sale. The time of buyers and salesmen is wasted by the system into which we have drifted, and the producer pays for it in the end. The condition of our cheese markets

and the practices which are growing up should receive your serious consideration. The one thing always to be borne in mind by salesmen is the absolute necessity in their own interests of getting their cheese, especially their early cheese, into consumption as quickly as possible.

On another point I fear the effect of good advice has not been very apparent. The absence of demand for fine Canadian cheese for home consumption is as clear and as deplorable as ever. This is all the more regrettable when we consider the remarkably low prices of the past year. For a considerable time fine Canadian cheese could actually have been sold by our grocers with a profit at three pounds for twenty-five cents. At such a price as this, surely it should have been a drawing card for the grocery trade. Still, home consumption does not seem to have been stimulated to any appreciable extent. There is little evidence of any active or organized effort on the part of the dairy interest to popularise and increase the demand for Canadian cheese at home. In this respect, I repeat, we ought to take a lesson from our neighbors who now rely solely on their own markets. And in another direction too we may learn a lesson from them. They have spent enormous sums of money to introduce American corn products into Europe. They have taught the people over there how to use such food, and thus have conferred a boon especially on the poor of the old world, while they have greatly enhanced the price of the largest product of the American farm. Still, we go on allowing our people to neglect the use of one of the finest and cheapest food products of this country. Those who represent the dairy interests of Canada should never allow this question to drop until our home consumption of cheese is increased tenfold.

The conditions of the markets this year, and the outlook in our own and other countries, through the increased production of cheese, present and prospective, brings the cheese-makers of this district face to face with the fact that they can now achieve continued prosperity only through a successful struggle for supremacy against new and increased competition. There will no longer be any royal or easy way to success in the dairy business. The whole world knows our secrets. Indeed, there are none any longer in such an industry as ours. What you have done, what you are doing, can be done by others. Unless you realize this and act upon it, you will not long retain the first place which you have held in the past and hold still. All this means simply that you cannot rest on your oars. You must improve your quality or be beaten in the race. The possibility of being forced back to second place is one which should never be lost sight of. It constitutes a danger far more real than some of your indifferent makers, non-progressive directors and careless patrons seem to imagine. Improved quality should be the watch-word of every dairyman throughout Western Ontario.

In spite of the dangers ahead and the serious discouragements of the past year, the cheese-makers of the Ingersoll district—that is, of Western Ontario—have no reason to fear the future, much less to abandon the industry. You cannot, as I have said, raise the market price in Great Britain. But there are two things you can do. One of them has already been discussed. You can greatly improve quality. In the second place, you can as greatly decrease the cost of production. Patrons and directors seem often to lose sight of the fact that if they could produce cheese at six cents and sell it at eight they would make as much profit as if they got ten cents for cheese which cost them eight to produce. Here is the whole problem of the future in a nutshell. It is the problem which you must now face. How can you, while improving the quality, decrease the present and past cost of production? Without anticipating the discussions of this convention, which should all relate to the solution of this problem, let me suggest in a brief and general way some things which you may do. You have suffered seriously during the past two seasons, and during many other seasons, from drouth, with its many damaging results and losses. Still, your patrons as a class are in the mere beginning of an adequate system of soiling and ensilage production. By better provision for fodder, both in summer and winter, by better facilities for its use through labor-saving devices and otherwise, you can keep more cows to the acre and produce more milk at less cost per pound. In your factories, too many of which are very old, and furnished still with the antiquated appliances of the past, there is great room for economy and efficiency. New districts which start with new factories, new machinery, labor-saving devices, all the results of your experience and

of others, have a distinct advantage over you—a fact which it is not pleasant either to realize or to point out. But unless you do realize it you are in danger, I repeat, of falling behind. In another direction, too, you are throwing away enormous sums of money. It is no hobby with men or with others who have taken up the subject when we declare that the cost of haulage in connection with cheese factories is enormously larger than it should be. With improved roadways you could greatly decrease it, and thus add to the profits of your factories—to what extent I shall not stop to discuss. But the unnecessary waste through bad roads will certainly amount, even in the most favored districts, to a considerable fraction of a cent per pound in the cost of making cheese. In some sections this waste in excessive cost of haulage is so great as to almost wipe out the profits of the producer. Still dairy farmers do not seem to be exerting themselves for improvement in road construction as they ought. At a meeting of dairymen at Embro recently from various sections, a resolution was passed deploring the excessive loss to the cheese-making industry through bad roads, and calling upon the councils of several municipalities to take steps to improve them. But systematic and organized effort in this direction has still to be seen among the dairymen of Canada—who ought to be the most enlightened and progressive in this as in other matters relating to agricultural progress. I repeat and emphasize the assertion, that next to quality the future of cheese-making in this and every other district of Canada now depends on decreasing the cost of production through modern ideas and progressive methods.

But there is one way in which you should not seek to decrease the cost of production; that is, by grinding down the makers to wages that will leave nothing as the reward of honest effort and successful skill. Last year I took occasion to say on this point:

"The cheapest cheese-makers are the dearest in the end. We are demanding not only greater experience but special training at the dairy schools from the makers in these days. While the supply of men who are willing to take factories may cut down the price of making, it will be found in this, as in other industries, that to secure skilled and superior intelligence we must offer the incentive of a just, if not a liberal reward for honest, intelligent and successful effort The tendency of which I speak seems greatest in the older sections, which are in danger of losing their best men through inducements offered them by the newer districts and by other provinces or countries anxious not only to begin right, but to win in the race for supremacy."

Here again I fear it must be confessed that it is easier to give advice than to secure its being acted on. Instead of an improvement in this respect, so far as I can learn, there has been a positive retrogression. Competition among makers, who are swarming into the business from the dairy schools, has enabled directors in many places to cut down the price paid to old and experienced men, or to engage new men often inferior to them. Probably the low price of cheese has created a new incentive to such a penny-wise and pound-foolish policy. On the contrary it should afford a most clear and potent reason why the very best makers alone should be engaged and why they should be paid more liberally than ever. I repeat the warning of last year, that unless the makers of this district are more liberally treated than in the past, you are in danger of driving the best of them into other and newer districts, which are your rivals and which in time will surpass you in quality in the British market. In view of this clear and serious danger the patrons should consider whether it is true economy on their part to demand of directors that they engage the cheapest makers rather than the best ones at a liberal price for making. If the present tendency is to go on it would be much better to close up our dairy schools. The class of young men who are going through these institutions will not work for nothing even in the pioneer dairy district. If they can't get adequate payment for their skill, hard work and experience in this district, we are simply providing skilled men who will be our rivals elsewhere—probably in the United States or other countries. There is, and I emphasize the statement, no economy in cheap makers. And in this connection I am glad to see that the makers are coming to the front and asserting themselves in the associations and conventions. No industry

ever thrived without adequate encouragement to special talent. And quality in the Ingersoll district will not survive much more of the baneful tendency which we have seen in the engagement of cheese-makers.

Allow me also to especially draw your attention to a paragraph in the annual report of your Directors. I refer to the vexed question of carrying whey in milk cans. This practice is a menace to all effort for the improvement of quality, and one which must be removed Our sanitary laws interfere with what may be called the liberty of the people—that is, the free action of those who are willing to do injury to others—in many directions. They prevent the pollution of wells, of streams, of our own premises, and the lanes and streets of our towns and cities. Still, we allow slovenly cheese factory patrons to pollute the vessels in which is carried the most susceptible and easily tainted of all our natural food products. Now I am not prepared to urge the stoppage of this vicious system by law, because we are sometimes inclined to seek relief from legislation and to get too much legislation, where we are perfectly able to help ourselves without it. It will be readily conceded that every patron has a right to get his whey back from his cheese factory if he can make arrangements with his management to do so. But I contend that he has no right, no moral right—and he should have no legal right—to injure a natural product from a hundred or more other patrons, by a filthy and vicious practice which every experienced and progressive dairyman in this country, and in the world, condemns to-day. Neither one man, nor any number of men, should have the right to introduce filth—or, it may be disease—into the common pool of milk to which scores of cleanly and conscientious neighbors contribute. Therefore, I contend that if reason, whose voice is heard on this point from our best teachers at every dairy meeting in this country, cannot influence the patrons in this direction, the sinners should be told that if they must have their whey back from the factory, they shall not carry it there in cans intended solely for pure milk. Bear this in mind: you will never improve your quality in this district, nor will you long keep ahead of other districts, until you settle this problem in the interests of the cleanly and conscientious producer of milk.

Another question referred to by your Directors is the work of inspection. I regret that during the past season we have not been able to arrive at a solution of what will be the most important problem before your Board of Directors for the coming year. The experience of the leading men in the trade who have thought most on the subject leads to the belief that more inspection and instruction is required at the factories throughout the season. This can only be secured by co-operation. Unless the factories throughout the western district will unite in groups, thus co-operating among themselves as well as with the board of this Association, it is not easy to see that the results aimed at will be achieved. The funds of the Association, although sufficient for ordinary purposes, are not great enough to cover our enlarged area of cheese production and to do the work of special instruction and inspection as it ought now to be done. This is one of the business questions which you should discuss and on which you should make a recommendation to the Board for 1896.

Looking over the work of this Association and of other agencies connected with our dairy interests, and the critical condition of the cheese industry at the present time, there ought, it seems to me, to be a clearer understanding of the situation and the causes which have led up to it, and also of the means by which the interests of our dairymen can be promoted in the future. To secure prosperity through wise and united efforts, there ought to be a unity of purpose and unity in methods as well. It is more than doubtful if we have got this throughout Canada at the present time. We seem to have come to a point when there should be a clearer understanding as to the sphere of duty, the area of work, for the Federal and Provincial departments and officials that are connected with the dairy industry. In some directions at least, they seem to be overlapping each other, if there efforts are not positively antagonistic. Work which in one province is being done by local enterprise and activity is being done through federal effort and with national funds in another. There should be no difficulty in all the agencies which make for progress, and which have for their common object the improvement of the

quality of Canadian cheese and its reputation in the markets of the world, uniting and working in harmony side by side. This can only be done, and obvious difficulties and dangers avoided, by Federal and provincial activity being each confined to its own sphere. The recent history of our efforts and their results must make it clear, especially to the dairymen of Ontario, that the time has come when there ought to be a clear recognition of the lines along which every agency for the promotion of the general and varied local interests of the dairy industry should work.

In conclusion, let me allude to another question discussed last year. You may remember that a recommendation was made to the Dominion Government in favor of branding cheese. After discussion in Parliament and the collection of much information throughout the country, the conclusion was arrived at that it was not well to press a bill which was brought in by Mr. McLellan during the session. For myself, although in favor of branding of cheese, I am not disposed to assert that the conclusion was not warranted by the great diversity of opinion which was developed by discussion throughout the country. Where such strong adverse opinions are held as were expressed by men in the trade, and whose judgment is certainly entitled to respect, it is better to go slowly than to proceed in haste and arrive at a wrong conclusion. The subject is of such importance that its discussion should be continued at this and other gatherings of dairymen; and it would be a great advantage in arriving at a wise conclusion if we could have the voice of dealers as well as producers, especially of those who did not agree with the finding of this Association last year.

In conclusion Mr. Pattullo alluded to the programme provided for the present Convention, and thanked the members of the Association and his fellow Directors for all the courtesy and the generous support extended to him during the past two years of office.

Mr. BLAYNEY: I have carefully followed the President's address, and I must say that I am well satisfied with it as a whole. He must have taken a good deal of interest in the dairy business during the whole year to have considered it so minutely and so thoroughly. There is a great deal more in the words he has spoken than perhaps we can comprehend just for the time being. As I said in the few remarks that I made before, the patron and the cheese-maker and all men who are interested in the business are in the same boat We are face to face with the competition of the world as far as the export trade is concerned, and besides we are face to face with an increase of cheese-makers. I like the President's idea that we should encourage home consumption. Our cousins across the line have ever striven to increase home consumption, so much so that at present they do not rely altogether upon the export trade. It would be a grand thing if we could have home consumption—a good market at home, and an export market as well. I also like the idea that efforts should be turned to improving the quality rather than increasing the quantity of cheese produced. I think it is altogether wrong that the man who consumes home cheese should have to pay a little more for it than in the case of the export market.

The PRESIDENT: And get worse cheese.

Mr. BLAYNEY: I think it is a wise policy to supply our home market first.

CHEESE MARKETS AND THE BEST METHOD OF OPERATING THEM.

Mr. J. S. PEARCE, of London, then read the following paper:

This is a subject that will bear a great deal of careful thought and discussion. What is the best method of operating a cheese market? This is a question much easier asked than answered. In order that we may know something about the past methods of operation and how they were conducted, it will be necessary to go back and give a brief review of their history.

Away back in the seventies, about '72 or '73 (I cannot get the exact date), a market was established in Ingersoll, similar to one that had been already established at Utica.

The Utica market was held on Monday and the Ingersoll market followed on Tuesday. This market was merely a gathering or meeting together of sellers and buyers, and the business was conducted in a loose, irregular, indefinite and unsatisfactory manner—the buyers and sellers meeting in different parts of the room, or probably on the street corners or in some of the hotels, and making negotiations for the sale of their cheese. Sometimes it was very difficult to find out what had been done or whether any business had transpired.

Later on, the plan of having a bulletin board, with the names of the factories and the number of cheese they had to board, was adopted, and helped to facilitate matters to some extent; still the business was not just as satisfactory as it might have been, as each seller and each buyer tried as much as possible to negotiate his deals in a private way.

In the year 1876 a market was established in London. The late Mr. John Wheaton was elected president, and held that office until his death. Mr. Geo. F. Jewell was secretary, and filled that office for many years, until press of other work compelled him to give it up, and it was transferred to the present secretary, Mr. J. A. Nelles. The plan adopted by the London market was the same as the Ingersoll, viz., a bulletin board, on which the secretary boarded each salesman's cheese, with the name of the factory and the number of boxes offered. The buyers and sellers stood around and met each other —sometimes in the hall, sometimes in the arcade, sometimes in the street and very often at the hotels.

In 1892 a new feature was introduced and adopted, termed the call system, and had its regulations been lived up to by the buyers and sellers, there would have been no occasion for this paper or any discussion on this subject. How the call system is worked need not be described, as you are all familiar with this system and its working. Since the introduction of these markets at Ingersoll and London, they have been gradually extended until there are now some five or six markets held in Western Ontario, viz., London, Ingersoll, Listowel, Woodstock and Brantford; but these markets have degenerated and are now, to a great extent, a farce, owing to the fact that the salesmen do not sell on the market, but simply use the market as a feeler, using the bid offered on the market as a lever to obtain a better price either before they go home or some day after the market. This, to me, seems a great mistake, and unless some better and more rigid rules are introduced and lived up to, the markets will eventually be abandoned, and will have to go back to the old plan of doing business on the "curbstone," as it is termed in large cities. Why is this, and how is it that they have, as it were, outlived their usefulness? The cause for this lies in the fact that the salesmen have not been true and loyal to the association to which they belong, nor have they lived up to the rules and regulations adopted by each market. They have, as it were, used the market as a sort of tool, or indirect means, to try and get a better price than their neighbor.

I am sorry to say that the buyers are also not altogether blameless in this matter as they, in many instances have paid considerably more money the day after the market than they bid at the market. This has been an incentive to the salesmen to refuse the bids on the market and wait for a day or two and endeavor to get more money, and the outcome is now that the best sales have been made off the market; but, I must say frankly that in my opinion while the buyers are not blameless, the salesmen are the greater sinners and the more responsible parties for this back-sliding.

It seems a great pity that the markets could not be kept up to the standard of efficiency necessary to the carrying on of such in an honorable, business-like manner. Do the salesmen want to see markets go back to where they were ten years ago? Do the salesmen want to stand around on the streets, hotels and other places by the hour not knowing what has really been done or what prices have been offered or paid. If they are indifferent, and want to see the markets retrograde, then they cannot pursue a better plan to bring this about than the method adopted during the past summer.

As an illustration to what an extent the markets in London under the call system have become a farce, I will give the result of my tabulation of the London market during the past summer.

Seventy-one factories boarded their cheese on the London market, more or less during the summer of 1895, and twenty-nine markets have been held. During these twenty-nine markets there have been 136 actual sales made, and these have been spread over these twenty-nine markets.

There were eleven factories which boarded their cheese and made no sale on the board. There were twenty factories which made only one sale during the season. There were twenty factories which made two sales. There were eleven which made three sales. There were seven which made four sales and there were three which made five sales. One factory boarded cheese twenty-four times; three factories, twenty times; two factories, nineteen times; six factories, seventeen times; two factories, sixteen times; three factories, fifteen times; three factories, fourteen times; five factories, thirteen times; three factories, twelve times; one factory, eleven times; five factories, ten times; three factories, nine times; three factories, eight times; two factories, seven times; four factories, six times; four factories, five times; five factories, three times; six factories, twice; four factories, once.

This will give you some idea of the very unsatisfactory manner in which the sales have been conducted, and business done on the London market, during the past summer; and from what information, I can gather, I am led to believe that the other markets throughout the country are even worse than the London. I have not had time to analyse the Listowel bulletin boards, but in glancing them over, I am satisfied that the sales on that market have been even less, than on the London market, as there are some nine of these markets at which there was not even a single sale. I have not the bulletins of the other markets, but I am told that the Brantford is much better. Now, what is the remedy for all this unsatisfactory state of affairs and retrograde movement? To my mind a very simple remedy would be a resolution or agreement on the part of every salesman to sell on the market only, and under no conditions elsewhere. If this were done the salesmen would find that the buyers would then immediately bid the best price that they were prepared to offer which is not the case now. But will the salesmen do this, or have they sufficient will power to carry out such a resolution if adopted?

What would be the next best remedy? To my mind it would be the grouping of the factories into combinations or syndicates, not only for the purpose of selling, but also for more economical management in the shape of milk drawing, which is a big item in the expense of manufacturing cheese, thereby effecting a saving in the cost of manufacturing, These methods would also secure a more uniform line of goods. Our factories are said to be co-operative, but in many ways they are far from being co-operative. In fact, they are the keenest kind of competitors among themselves for the patronage of the patrons living in the neighborhood of the different factories, and in some instances inducements are thrown out for these patrons to change from one factory to another. It is not an unusual thing to see two or more milk wagons going over the same road gathering cans here and there at different intervals. Under this mode of competition all kinds of milk is taken. The cheese maker to a certain extent is at the mercy of the patrons, and should he have sufficient authority or will power to refuse or reject a can of milk, the chances are that the patron will turn around and tell him that if he will not take it, some other factory will, and the result is that the patrons become indifferent and the cheese makers are cut down in wages—all for what?

Now, there is no occasion for this unnecessary competition. Co-operation on all these lines would be of much greater advantage to every patron, and would enhance the value of his product considerably, instead of depreciating it. One great advantage of this mode of co-operation or syndicate would be the uniform quality of cheese that would be turned out from each and everyone of these factories, they of course being under the supervision of some one inspector or overseer in connection with such combination or syndicate.

Another advantage would be that one salesman would act for the entire syndicate, thereby reducing the expense of selling, and would also increase to a considerable extent the amount of money obtained at the different sales and markets, as every buyer would be willing to pay a fraction more for a large lot of cheese provided he could get it from

one individual; besides he would know that the goods would be all uniform and properly made, handled, boxed, branded, etc. In Eastern Ontario several of these combinations have been for many years in successful operation and I am informed that they are giving the very best results, and the patrons are entirely and thoroughly satisfied with this mode of procedure.

Mr. Campbell, of Brantford, is grasping my idea and falling into line. Hear what he says with regard to "How to Improve the Markets." You will find his communication in full in the special issue of the Woodstock *Sentinel-Review*, and I would advise every one of you to read it carefully:

"I believe in a local inspector, or you might call this person an assistant cheese-maker, who should be appointed by the executive officers of the Western Dairymen's Association and be in every way subject to their regular travelling inspector and who would have charge of say from twenty to thirty cheese factories, (I am not a practical cheese-maker and may set the number of factories too high) said factories to pay him according to their output. His duties would be to visit, work with, and in every way possible assist the cheese-maker in each factory to turn out the best quality of cheese, to have the cheese in each locality under his charge of one uniform grade, and by his advice and teaching, both to the local boards of management and cheese-makers, as far as possible do away with all jealousy, etc., towards each other, in a word to improve the quality to such an extent that his salary would be more than made up to those who would employ him by the advance in prices that they would receive for a number one article. All will admit that better goods than what we have can be made, that better goods mean higher prices and greatly increased consumption.

"And now as to buyers! My experience has been that when a good article is offered they never hesitate to bid keenly against each other and to pay all or more than the goods are really worth to all appearances. A cheese market or, as sometimes named, a dairymen's association, for a particular locality should have reasonable and well considered rules and regulations, and all interested buyers and salesmen should respectfully abide by and in a firm manner enforce all such rules.

"Salesmen should be carefully selected for their suitability for the position, and once installed in office, should be assisted in every way by those for whom they are working, but should not be in any way interfered with by owners or boards of management. A salesman can inform himself and judge of the situation when on the spot better than any lot of men residing miles from daily papers, telegraph offices and cheese markets. Salesmen should not be nervous, nor jealous of their associates in the same line of business, and should be able to make up their minds instantly; in fact, to have made up their minds before the opening of the market. They should not offer goods that will not be ready to move within the expected time, and rules governing the same. They should not offer goods that they do not mean to sell, and once offered, all goods should be sold to the highest bidder, showing no partiality to buyers. Salesmen have no right to be speculators with other people's property. If they get the best price that the market will afford, they have done their duty, and the experiences of the past three years ought to convince us all that it is better to sell often, get the money into the hands of the patrons, and send the cheese forward, or at least get the cheese out of the curing rooms, and the money into circulation. More patrons have become discouraged by waiting long, long periods for their cheques, than by the fact that a neighboring factory has got a sixteenth or an eighth higher price. All cheese markets should dispose of the offerings at each meeting by the call system, and all buyers and salesmen should do their best to clear the board at each meeting, and I firmly believe that when it is well understood that buyers and salesmen have met for the purpose of doing business in a fair and above board manner, confidence will be restored and trade in this great staple will improve."

I want here to call your attention to the method which has been adopted in the Province of Quebec with the very best results. In that Province there was an Act passed by the Quebec Legislature, under which these syndicates are operated. This Act was passed in 1891. Each of these syndicates has an inspector, and this inspector is

required by this Act to hold a certificate of competency from the Board of Examiners. This Board is appointed by the Quebec Dairymen's Association. Over all these inspectors is the inspector general. There are now some thirty of these syndicates in successful operation in Quebec. Each syndicate has from fifteen to twenty-three factories working under it, and these thirty syndicates have some 540 factories under their control.

The duties and regulations of the Dairymen's Association with regard to syndicates are laid down as follows in the Quebec Act :

1. Establishing regulations for the formation and working of the said syndicates.

2. Of directing and superintending the syndicates.

3. Of establishing rules to define the duties of the inspector-general and of the inspectors who are to superintend the production of milk and the manufacture of butter and cheese in the establishments so organized into syndicates.

4. Of appointing a Board of Examiners for the examination of candidates for the office of inspectors, and of laying down regulations for the working of the said Board.

And whereas, there is granted to each syndicate a sum equal to half the outlay incurred for the service of inspection and instruction organized in the syndicate, including the salary of the inspector, his travelling expenses, and other expenses relating directly to the said service, but which sum granted must not in any case exceed $250 (two hundred and fifty dollars) for each syndicate.

Whereas there has been granted to the said Association, besides its subsidy and other ordinary concessions, an additional sum of $1,000 (one thousand dollars), for the expenses necessary for the direction and superintendence of the syndicates, as well as for the maintenance and due working of the Board of Examiners above mentioned.

The said Association constitutes, as follows, the programme of the formation and working of the syndicates, of their direction and superintendence, of the manner of conducting the proceedings of the Board of Examiners, and of the duties of the inspectors.

The PRESIDENT. I am glad that this admirable paper has been brought before you. I think we should not only deal with the practical and theoretical questions relating to the cheese industry, but also with the markets and what may be called the business side of the trade. There can be no doubt whatever as to the truth of the assertions which Mr. Pearce has made to us. The real question is, how shall we get rid of the condition of affairs into which we are drifting? The necessity for the discussion of this question at these large conventions is this : The salesmen will never reform the markets until they are backed up by public opinion. It is you and the patrons behind you who have got to bring public opinion to bear upon this and every other question before we can get reform. I would like to get the views of some here, and if you will permit me, I will call upon several salesmen I see around.

Mr. STEWART : I have had quite a lengthy experience in the cheese business as a salesman, and I must say that the past season has been one of the worst that I have experienced in that capacity. I would fifty times sooner take the old hole and corner system than the one that has been in operation at Woodstock market during the past season. I believe Woodstock is in line with the doings of all the other markets of the Province. I have heard buyers say that perhaps Brantford is the best, but even it has not been without its shortcomings in that respect either. It seems to me that Mr. Pearce touched rather too lightly on the shortcomings or wrong doings of the buyers. I feel that there are just as many sinners amongst the buyers as amongst the salesmen. I think myself that there should be a great improvement in the manner of doing business. I have said that if I have anything to do in the sale of cheese on the Woodstock market another year, and no better system has appeared, I will never board the cheese. When Mr. Pearce calls the present system a farce, he does not use an exaggerated word. It has been a perfect farce. With regard to the buyers, I think the system degenerated

in Woodstock this way. Listowel market was held next day, and if a bid was made on Woodstock market that would be carried of course to Listowel. I put the question strongly to one of the buyers, and he admitted such to be the case. Woodstock market was used only as a "feeler" for other markets. It has been an idea of mine for some years that grouping factories together for the purpose of manufacturing and selling would tend to a more uniform article. There is no doubt in my mind that an improvement would be made in this way, and I think there are other matters in which improvements might be made. At the present time every man that is buying wants to personally inspect the make at the factories. That costs a good deal of money and takes up a lot of time. I think there ought to be some individual in whom full confidence could be placed by the buyers, and that buyers should buy from the standpoint of that man's inspection. There is an enormous amount of unnecessary expenses as it is now. Forming groups of factories would, to my mind, overcome these expenses, and the quality of the cheese would be certainly more uniform. I would like also to see the home consumption of cheese encouraged by putting the best instead of the poorest into the market. We could not at the present time, I think, go into any grocery store and get a piece of cheese that would be at all equal in quality to the general run of cheese exported. Mr. Stewart concluded by admitting that over-production had much to do with the low prices last year, but pointed out that they had also been caused by the very cold winter experienced in England, the working men purchasing cheap mutton and eating soup instead of cheese as formerly.

Mr. WHITE: How would you deal with the question of buyers who purchase cheese say three weeks before they are ready to ship?

Mr. PEARCE: Simply not sell them. Adhere to that rule.

Mr. WHITE: But suppose the market went back?

The PRESIDENT: Let it go.

Mr. WHITE: Where would your patrons be?

The PRESIDENT: Educate them. It is not in the interest of cheese-makers to sell cheese until they are ready to ship. It is no advantage to anyone to ship them green. Mr. Stewart seems to agree with Mr. Pearce in everything, only he is not quite satisfied that he hit the buyers hard enough. That is the way with us all. When we listen to a good sermon we are all revolving in our mind how well it fits, especially in its application, the other fellow. I think if all the salesmen would agree to sell their cheese when boarded the evil would be abolished. Buyers as a class would be fools to bid on cheese which they know in their hearts the salesmen have no idea of selling, and which have been boarded merely as feelers to obtain pointers as to what the salesmen may afterwards expect to get. There is competition among the buyers, and if they know that cheese when boarded is for sale they will bid fast enough.

Mr. EAGLE: I have been very much interested in the discussion so far. I thank Mr. Pearce for his complimentary reference to the Brantford market. I think it is interesting to note that in proportion to the amount of cheese boarded, Brantford sells more than any other market in Western Ontario. The reason the Brantford market was established was because the men of our district could not get to Woodstock and back home in the same day. When we first established the market in Brantford most of the salesmen made up their minds that they would board and sell their cheese every market day. I believe the majority of the salesmen on the Brantford Board have adhered to that rule, and I think they have profited in consequence. Five years ago I made up my mind that I would take market prices every market day. For four consecutive years I have done that at Brantford, and I believe I averaged one quarter to one-half cent a pound more than I did before I started selling every two weeks. Referring to Mr. White's point, I hold that if a man sells his stuff before it is made he is a speculator; if he holds it after, he is a speculator. If he takes market prices—and I believe the principle holds good in every kind of farm produce—I know by my own experience he comes out ahead. With regard to the article written by our secretary and read by Mr. Pearce, I may say

that Mr. Campbell carries out the principles enunciated by him every market day, and as a result he got nine and five-sixteenth cents for his October cheese. The buyers knew Mr. Campbell was going to sell; they were anxious to get his cheese, and they paid him nine and five-sixteenth cents. I think that if one or two salesmen at each of the markets in Western Ontario would make up their minds that commencing next spring, they would always take market prices, such an object lesson would be provided that all the salesmen would soon fall into line.

Mr. RINCH: I have always made it a practice to sell on the board. This last year I only sold three times off the board. As regards the salesmen being the greatest sinners, I beg to differ. I have had buyers come to me two minutes after the market had closed and offer me one-sixteenth of a cent more than the price bid on the market that day.

Mr. PEARCE: When I made the remark that the salesmen were the greatest sinners, I meant by that, that salesmen have it in their own hands more than the buyers. The buyers we know do some very indiscreet things, but the matter all lies in the hands of the salesmen. If the salesmen will make up their minds only to sell on the board the whole question is settled at once.

Mr. CHALMERS: I am one of the salesmen at Listowel market referred to by Mr. Pearce. I have sold all my cheese over the wire, but, at the same time I advocate selling on the board. I for one would be satisfied to go in and join with the other salesmen and pledge ourselves that we would sell on the board. Still I don't think we should be bound to sell after we boarded them. Although we may offer on the board at a certain market I don't think that we should be bound to sell on that market. Mr. Pearce would go so far as to say that it is speculation for us to hold our cheese from one market to another. I don't think it would be wrong.

Mr. PEARCE: I didn't say it was wrong; I said it was speculation.

Mr. CHALMERS: As far as I am concerned I made a very good speculation this fall. In a week's time I got the advantage of a rise of one and three-eighths cents.

The PRESIDENT: What factory is that?

Mr. CHALMERS: Honey Grove cheese factory. I happened to see that there was a move amongst the buyers the day that they were paying eight cents for cheese. I held my goods and in a week's time I sold them for one and three-eighth cents more. But, I for one, would be satisfied to join with my fellow salesmen to pledge myself to sell on the board. Mr. Chalmers concluded by saying that it was his opinion that the buyers did not bid so high as they would do if hey knew that the salesmen intended to sell.

The PRESIDENT: We are getting along very well. I think we should hear from the buyers. They ought to have the privilege of defending themselves. The remark made by Mr. Rinch is very true. There is not the slightest doubt that the buyers are willing to pay more off the market than they offer on the board. But that does not solve the question; in fact it is rather aside from the real question. The point is this: if these buyers knew that they could not buy the cheese off the board they would not make any offers off the board, and there is where the salesmen have the thing in their own hands. The buyers are competing against each other. They must have the cheese and if they can't buy them off the board they will pay all they are worth on the board. The question is, how to bring about that condition.

Mr. MCLAREN: I agree with you Mr. President, the matter is all in the hands of the salesmen. If the salesmen bind themselves to sell only on the market they will get the biggest prices possible. If the buyers once knew that they could not buy the cheese off the market, they would buy the cheese on the market. If the salesmen will adopt that system, and the buyers know that no sale will be made in the country or off the market, I think there will be no difficulty in regulating this matter. I think we should hear from some of the salesmen of the big factories. If they will adopt the principle there will be no difficulty in the world of making it a success.

Mr. PRAIN: I worked hard to get the call board, and I have sold on the call board. I would not agree to go back to the old way.

R. M. BALLANTYNE: I quite agree with those gentlemen who have said that the call board as carried on now is a farce. I have been around the markets for pretty nearly the whole season, and at every place they were a farce. At the Woodstock market there was at the commencement of the season some slight attempt at sticking to the rule, but it degenerated. During the latter part of the season it was as bad as any of them. At Listowel at the end of the year no attempt was made to follow out the rule—there was no bidding at all. Some business was done at London, and some business is still being done there; but even there the men felt that if they sold on the board they would be taking less money than they might get off the board. That feeling has crept in at all boards. It is almost impossible to get salesmen to sell—to get them to feel that they can make just as much on the board as they can afterwards. The buyers have arrived at the conclusion that it is not wise to make their best bid on the board. I do not think the question will be as easily solved as a good many men seem to think. You have first to get it into the heads of the salesmen that they will receive as much money by selling on the board as they will by holding their cheese until afterwards. I do not think they will bind themselves. If that could be accomplished, you would get over the difficulty at once; but I don't believe any salesman will bind himself to sell on the board, and unless that can be done, I don't see how the call board can be made a success either here or anywhere else.

Mr. WHITE alluded to the manner in which the buyers forced the half pound system on the salesmen by agreeing that they would buy in no other way, and suggested that the salesmen should adopt a similar method in regard to selling on the market.

Mr. GOODHAND: With regard to the half pound system, the buyers passed a resolution that it should live, and live it did. As to the sinners under the present system, if the buyers and salesmen were put in a box and shaken up together, I don't know which would come out first. The only way that I can see out of this trouble is for the buyers to pass another resolution that they will buy nowhere except on the board, and then I will guarantee that the salesmen will only sell on the board. The buyers will then get the cheese and we shall get better prices.

The remarks of the last speaker were greeted with applause, whereupon the PRESIDENT said: I notice that some of you seem to approve very much of that suggestion. I do not desire to criticise, but it does seem to me that perhaps you are getting the cart before the horse. A number of the buyers here may be willing to do that, but they have not the matter entirely in their own hands. Supposing buyers here did agree not to buy outside the market, and other buyers came in from Toronto, and going around to the different factories purchased everything they could lay their hands on? On the other hand, the salesmen are completely their own masters. Mr. Chalmers made a pertinent observation when he said that you could scarcely expect salesmen always to be willing to sell their cheese; it might be in their judgment better to hold it. That can easily be obviated in this way: whenever the salesmen find the market in such a condition that they do not think it wise to sell their cheese, let them not board it. But I believe the only solution of this problem is that when the cheese are boarded they shall be sold. I have watched the market as a reporter and one interested in the trade. I do not know whether my opinion is of any value, but I give it to you for what it is worth. All my sympathies—I say it unreservedly—are with the salesmen. I want to see them get as much for the cheese as possible. The sympathies of everybody interested in the trade, outside of the buyers, whose business it is to pay as little for cheese as possible, must be with the salesmen. As the result of the observation of years, I am perfectly satisfied that there are two things that the salesmen should never do. In the early part of the season up to the summer, salesmen should never hold their cheese when they are ready to ship under any circumstances. With reference to the last part of the season, the conditions are rather changed. There is a little chance for speculation on the exercise of judgment. If a man comes in here, say on the 15th October, and he finds that the market is such that he is not going to sell his cheese, do not let him board them; but if he does board them, let him stand by the cheese as they are boarded. The real trouble is this: the salesmen have got the

patrons of the factory behind them. It is very easy for the patrons to find fault with the salesmen, and I know the salesmen are liable to be kicked out by people who do not know a tithe of the condition of the market that the salesmen do. There is the trouble, and one reason why I urge an agreement between the salesmen to sell only on the market, is that it would relieve them of a great deal of responsibility. If the salesmen can go back and say to the patrons, "We put up our cheese; this was all that it would bring," it would be a great relief to them. It would, I think, be much better for the producers of cheese if there were no salesmen at all on the market, although we would be sorry not to have them.

If the secretaries of the factories would send in a postal card saying "We have so many cheese for sale," I honestly believe (I am not advocating the system, mind you) that there would be better prices got for cheese than have been offered on the boards during the present and past seasons. Let me make one personal reference. I have reported the markets here for some years. I have watched them very closely. I have never been foolish enough to personally give salesmen advice as to whether to sell or not; but I have very often offered advice through the papers, and I feel a great deal of satisfaction in knowing that I have never made a mistake yet in reference to the markets whenever I ventured the opinion as to how they were going. I do not take any credit at all. Sometimes by not watching these things salesmen have got badly left. I remember on one occasion a very intelligent salesman who got left by holding on speculation. He actually thought that the papers had had something to do with the depression of the markets simply because they threw out a few hints for his benefit, and which would have been of material advantage to him had he taken them. I need scarcely refer to the influence which a local paper has for depressing or raising the markets which are entirely dependent upon Great Britain! I strongly urge that the salesmen are the people to act in this matter of selling on the market. They should enter into an agreement that, whenever they board cheese, that they shall sell, and that they shall not sell except on the board. If they do that, I believe the whole question will be settled.

Mr. BLAYNEY: If both the buyers and sellers have been sinners, as appears to be proven here, why not cease to sin? Let us come together honestly and squarely. We are all on the same boat. We all have a certain amount of competition to meet. If we join a board let us live strictly up to its rules, and let us not be shuffling any more. Perhaps the decreased value of cheese will do us good. When a good business man gets into a corner he will force his way out of it. That is what we have got to do in the future, and lay aside this accusing each other of committing sin. Let us in the future try and commit as little sin as possible.

Mr. WILLIAMS: I am neither a salesman nor a buyer, but I think if all the cheese were sold on the market on the call system it would have a tendency to raise the quality. Buyers do not like to pay the same price for all cheese that are offered, because they are not all of the finest quality. I do not think they are to blame. Parties who have not got a real fine quality of cheese do not care to put them on the board and take a less price than their neighbors. Consequently I think if it were made imperative that all cheese should be boarded, it would have a tendency to improve the quality. Those now turning out poor cheese would be compelled to improve the make.

The PRESIDENT: The point made by Mr. Williams is one of the best that has been brought out yet. It must have been the observation of everyone who has attended the cheese markets that the buyers scarcely deal fairly with the cheese trade or with themselves. Under the present system the poorer factories get about the same price as the best factories. If the cheese were put up for this competition which we aim at, I believe the results would be better. There would be an assorting of the cheese, and if it were known that gilt-edge cheese would get gilt-edge prices, and that poor cheese would not, then you would see an improvement in the quality.

Mr. LEITCH liked the proposal. He believed the buyers had had a good deal to do with the present state of affairs through purchasing cheese off the market at a higher

figure than that quoted on the board, the buyer and the seller promising to say nothing about it. He thought both parties had been guilty of such work, and that it had deteriorated the usefulness of the call board system.

Mr. DOWNHAM: I think Mr. Williams touched the key-note of the whole situation. As long as there are good cheese and poor cheese you will never get the buyers to buy or the sellers to sell them on the market. Every salesman who comes to the market thinks he has good cheese, but buyers know they are not all good. The buyers will never pay the same prices all round unless you can get the factories to make cheese all of one quality.

Mr. PAGET: After all this discussion, I do not know that we are very much further ahead than we were at the beginning, as far as being able to solve the mystery is concerned. I am of opinion that, in addition to having the salesmen of the factories unite, it will be necessary to have the buyers unite. I think if the buyers and sellers on the different markets were to bind themselves not to buy or not to sell off the market that this difficulty could be got over very much easier than in any other way. The President, in speaking about the buyers binding themselves not to buy off the market, referred to outsiders who might come in and buy. That could be obviated in this way. The Secretary of the Brantford market has a book, and upon that book are written certain rules, and each buyer and each seller is supposed to subscribe his name to these rules. If every cheese market had a set of rules, one of which was that no cheese should be sold off the board, then the outside men before they could buy cheese would have to subscribe their names to those rules. I am heartily in favor of selling cheese upon the market, and upon the market only. I have endeavored to carry out that idea in my own experience to a very great extent, although sometimes I have sold off the market, but I have found that when I have done so I have been the loser. When I have sold right along on the market I have been invariably the gainer. If all the buyers and sellers were to unite and bind themselves, then we would overcome the difficulty. I think that buyers ought to be willing to bind themselves just as well as salesmen. If the buyers could force the salesmen to comply with their requests regarding the half-pound weight, why not in this? I think if the buyers will take a firm stand with the salesmen this difficulty can be got over, and unless they do I do not think it can.

Mr. R. M. BALLANTYNE: One of the main difficulties is in case all the salesmen of cheese factories are not members of the boards. It is not an easy matter for some of them to belong to any board. There are factories in some places, for instance at Windsor and Wallaceburg, that are so far from the markets that it would be an injustice to insist upon these men selling their cheese on the markets. For that reason the buyers could not bind themselves to buy only on the board. There is another reason. A buyer gets a large order for cheese, and he wants to fill it as rapidly as possible. If he is attending Woodstock market to-day he can perhaps only get 800 or 1,000. Under the rule you propose he would have to wait until the next market before obtaining the balance, whereas under the present system he can go around to the factories and fill his order in a short time.

Mr. PAGET: Where there are no markets available I don't see any objection to letting factories sell off the board; but take the neighborhood of Brantford, London, Woodstock, Listowel, there are none of the factories but can reach the markets. I know in our neighborhood there are a number of factories that do not belong to any board because they think they can do better outside the market. The buyers after attending the market slip around to these factories. They have no extra travelling expenses to meet, and they feel that they can give a little better figure than that quoted on the board. Every factory that is within a reasonable distance from a market should be compelled to sell its cheese on that market, and every buyer to buy there.

The PRESIDENT: The difficulty that I foresee of getting the buyers to make any agreement is simply this: it is opposed to their interests to make such an agreement, and it is asking a good deal of these men to come to an agreement that is against their interests. But what is asked of salesmen is to come to an agreement that will improve their condition. If we had markets such as this discussion aims at the buyers would have to pay

more for cheese than they do now by the hole-and-corner methods into which the markets are drifting. The reason the buyers came to an agreement over the half pound matter was because it was in their interests to do so. Now you ask them to come to an agreement which is against their interests, because if it were not why discuss the question? The reason that you salesmen are discussing this question is that by discussing it you will put money into your own pockets. The matter is entirely in the hands of the salesmen and those whom they represent. Just allow me to make a suggestion. I was collecting a good deal of information upon this and other matters connected with the dairy recently, and I got a paper from Mr. George Hately, a well known buyer in Brantford. It was too late for publication, but I believe there are some points in that paper that are worthy of your consideration. As there is some time left us this afternoon, I would suggest that the Secretary read that paper to you. I may say that when Mr. Hately wrote this paper we never had any idea that this discussion would take place.

HOW TO IMPROVE THE CHEESE MARKETS OF WESTERN ONTARIO.

The following paper, by Mr. GEORGE HATELY, of Brantford, was then read:

The request for ideas on this subject, affecting as it does the interests of some four hundred cheese factories, having an annual output in the neighborhood of forty-five million pounds, valued at about four million dollars, immense and constantly growing, shows the necessity for such a medium as the *Sentinel-Review*, that is in touch with and knows the needs of the trade, through which questions affecting these interests can be discussed. It is to be hoped that others, better qualified and more able to clearly express their ideas, have contributed, in this special issue, towards the solution of the problem. These markets can be improved either by abolishing the present system and substituting some other, or by taking the markets as they are and perfecting them. As they now exist, the markets are, like the British constitution, a growth. The foundation principle of the markets is good, but the structure is weak and imperfect.

The object that has been kept in view, in considering this question and in making recommendations, is: "To provide a mode for disposing of the product of the cheese factories of Western Ontario to the greatest advantage, at the smallest expense and with the least loss of time."

It has also been borne in mind: "That no system, constitution or code of laws, however perfect in theory, can be imposed on the members unless they themselves are ready for it and desire it." And after they are desired by, and have been accepted by the members, it should be borne in mind that "they cannot be made effective unless (1) Able executive officers are appointed, and this depends on the members themselves; (2) Power be provided for the executive, to enable them to enforce the rules and discipline the members."

In order to know how to improve and perfect the markets, as they are now constituted and practised, it is necessary to know in what points they are weak and faulty. Being voluntary associations, they have no legal standing and no legal power to enable their officers to enforce their rules. Consequently demoralization inevitably ensues through the continual and persistent breaking of the rules by individuals. Owing to the continual changing of the *personnel* of the market, there is no chance for the formation of a feeling of pride in our market to become permanent.

Another weakness is the failure hitherto to grasp the full idea of "the call board system," which has from time to time been in operation on all the markets. A third weakness is the facility with which the discovery of breach of rules can be evaded. This arises chiefly from the fact that members are not bound to buy and sell on the market only. With the markets at intervals of a week, or at intervals of two weeks, no rule compelling factorymen to sell on the market only could be enforced without loss and injustice to them.

The following recommendations are made:

1. To provide legal power to enforce the rules of the market.

2. To facilitate and expedite trading through the "call board system."

3. To provide for the adoption of rules to buy and sell only on the market, without increasing the risk of loss.

4. To assist the member who wants to buy to find one who wants to sell; and to assist the member who wants to sell to find one who wants to buy.

With these ends in view the following recommendations are made:

That an Act of Parliament (or of the Legislature) be obtained to authorize the incorporation of the cheese markets at Ingersoll, Woodstock, London, Listowel, and Brantford, on the persons who may be authorized to become members thereof signing a certificate and depositing the same in the registry office of the county in which the market is located.

The Act to empower the members of each market to enact by-laws, or rules, for the government of their market.

The Act to provide that a member of each market shall be entitled in each of the other markets to all the rights and privileges which the members of those other markets possess, except the rights of discussion and voting at the meetings.

The Act to provide that the persons who are eligible for membership of the markets shall be cheese merchants, their agents and representatives, dealers in dairymen's supplies, proprietors of cheese factories, agents or salesmen, duly appointed, of cheese factories, dairymen's brokers or agents.

The Act to contain the usual clauses for the settlement of disputes between members by arbitration.

The Act to provide that the title of these markets shall be "—— Dairy Exchange" for instance, "Ingersoll Cheese Market" to be called "Ingersoll Dairy Exchange." This is comprehensive, and is intended to prevent confusion arising between the provisions of this Act and the idea conveyed by the Board of Trade Act. The Act to provide for the affiliation of the cheese markets into a general board, to be known as the Western Ontario Dairy Board; such general board to be composed of all the members of the cheese markets; to be managed by a council composed of representatives from each market; such council to have power to frame general rules for the government of the cheese markets; such general rules, when framed, to be submitted to special general meetings of the members of each of the cheese markets for their approval, which approval may be given by resolution in the usual manner; and such general rules to become effective only after receiving the approval of *all* the cheese markets; and such general rules to supersede any rule of the cheese markets which may be contrary thereto.

The Act to empower the general board to grant charters for the establishment of markets at places in Western Ontario, on application being made to them; and to prevent the establishment of such markets at places in Western Ontario, where, in their opinion, it would militate against the best interests of the industry.

It is recommended that the by-laws provide for limiting the hours during which trading may be done.

The by-laws provide that trading be done publicy under the rules known as the "call board system."

The official appointed to act as "caller" should understand that the idea of the "call" is "an equal right to the sellers to offer their goods through the 'caller,' to name their price, and if not accepted, to offer a lower price;" as "to the buyers, to offer to purchase at a price, and if not accepted, to offer a higher price." Hitherto the practice has been based on the idea of the "auction" rather than on the idea of the "call." Should the present practice be allowed to prevail, it is recommended that when any

cheese remains unsold there be an additional "call," when the "caller" shall ask if any salesman desires to offer his cheese at a stated price. If so, the "caller" shall "call" the same. If offer is not accepted, the salesman may repeat his offer at a lower price, and so on, till a sale is made.

The by-laws shall provide that all cheese shall be sold publicly on the market under the "call board" rules, except when such cheese, having been so sold, has been rejected on account of quality. Almost the sole objection to such a rule being enacted has been the fear of loss arising by losing favorable opportunities for selling and depreciation in quality from heat during the interval between markets. This objection is removed by the privilege factorymen will have of selling at all the markets, thus giving them the benefit of a market nearly every day in the week, instead of weekly or fortnightly. And combined with this privilege is the introduction of cheese factory agents, or brokers, who would attend all the markets. The employment of brokers is recognized in the leading markets of the world as the most convenient and most economical mode of buying and selling. The method would be much the cheapest for most factories. The commission would be a very trifling charge per box, and, doubtless, capable men would engage as brokers, in whom the factorymen would have confidence. The factoryman would communicate, by letter or telegram, the particulars of his offering, with instructions as to lowest price and terms, if necessary. At the close of the market he would receive telegram giving, if sold, buyer's name, with price and terms. Brokers would sell as agents of, and in the name of, cheese factories, who must be members of the market, or of one of the affiliated markets. The broker must, therefore, for his own protection, be able, in case of dispute, to prove his right to sell for a factory. These ideas are somewhat crude, and are not very clearly set forth. Such as they are, they are given for what they are worth. It was intended to draft and submit a complete Act, constitution and by-laws, but want of time and opportunity for consulting with those accustomed to such work, and with those familiar with the requirements of the trade prevented this. If these recommendations meet with general favor, it is further recommended that an endeavor be made to have an Act passed at the next session, and that a constitution and by-laws be drafted, printed and circulated among the members of the various markets, ventilated through the medium of the press, and submitted to special meetings of the members of the various cheese markets next May or June for discussion, amendment and adoption.

REPORT OF DAIRY EXHIBITS AT THE INDUSTRIAL AND WESTERN FAIRS AND DAIRY TEST AT GUELPH.

GENTLEMEN,—As your representative to the Industrial Fair I take this opportunity of presenting my report. I attended the annual meeting of the Fair Association on February 12th and a meeting of the Dairy Committee on April 19th. There was not much change made in the arrangement of the prize list last year, with the exception that the prizes for white cheese were made equal in value to those for colored cheese. This was a wise move, as white cheese require as much if not more skill to make than colored. A change was made in the personel of the judge last year. For two or three years previous a judge had been selected from the United States. It was felt by some members of the committee that this was unnecessary, as by removing all marks of distinction from the cheese a thoroughly impartial judgment could be given by a Canadian judge. Besides, it was felt that a person thoroughly familiar with Canadian methods of manufacturing, and having an accurate knowledge of the excellence required in our Canadian cheese, especially as to its suitability for the British market, would be in a better position to judge the product of our makers, than one familiar with American methods only. I had the pleasure of submitting several names to the Industrial Executive, of persons whom I considered competent to undertake this work, and I am pleased to state that one of these was selected in the person of Mr. A. F. MacLaren, whose ability te act in the capacity of judge on cheese is recognized by everyone.

At the request of the manager of th Industrial Fair I assisted in judging by way of keeping a record of the score made by each exhibit. There were over 500 cheese on exhibition from Ontario, Quebec and Manitoba. All marks of distinction were removed,

and each lot of cheese scored according to the following standard for points of quality: Flavour, thirty-five; quality, twenty-five; texture, fifteen; color, fifteen; finish, ten; total, 100. Those obtaining the highest scores in each class were again thoroughly examined and compared and the awards made accordingly, so that a fair, accurate and definite plan was carried out all the way through and the awards are particularly valuable on that account.

There were twenty-eight prizes in all for Cheddar cheese. All these prizes were taken by Ontario makers, and twenty-two of them came to Western Ontario. After the awards had been made the cheese from the various provinces were compared. The cheese from Quebec, though scoring well in texture and finish, were lacking in flavour, having an objectionable flavour that left a bitter taste in the mouth. The cheese from Manitob awere smaller in size than the others and lacked chiefly in body and showed too much moisture for good shipping cheese. The Ontario cheese showed a wide range between the quality of the poorest and the best; this would apply to the cheese from Western Ontario, and is a striking proof of the need of more uniform methods of making. Their chief fault was also in point of flavour; but the objectionable flavours in them were of a varied character, and not a single marked flavour peculiar to themselves as in the Quebec cheese. There was an improvement in all the cheese in point of finish and general appearance over exhibits of other years, though a great many of our makers who exhibit cheese could improve considerably in these particulars.

The accommodation provided for dairy products by the Industrial is very good, and with the exception of a few minor points in regard to the location of the cheese in the dairy building, is as good as dairymen should look for. The exhibition draws exhibits from all parts of the Dominion, and supplies a means for bringing all Canadian cheese together and of producing a friendly rivalry between the various cheese centres that should be productive of much good to the trade. The display of butter was large and well presented, but as I had nothing to do with its arrangement I am not in a position to give any particulars regarding it.

The Western Fair.

Though not one of your representatives to the Western Fair, I have assisted the judges during the past three years by recording the score made by each exhibit of cheese and butter, and have on file in the Association's office a complete record of the points made by each exhibit of cheese and butter for 1894 and 1895, and have also the score made by each point of quality. I have also taken the trouble after each fair to fill in the score cards and mail them to each exhibitor. Had I the time I would like to give you in detail some of these records, as the lessons to be learned from them would be valuable.

There were on exhibition last year at the Western Fair 270 cheese. There was considerable improvement over the previous year's exhibit in finish and neatness. The quality of the cheese on the whole was not so good. Both cheese and butter were lacking in one essential quality—a perfect flavor. There appeared to be a wider variation in this particular between the butter exhibits of 1894 and 1895 than between the cheese exhibits of the same periods. Last year very much of the creamery butter, which is usually of good quality, was weak in texture and grain, and very much lacking in flavor. The highest score made by any exhibit of cheese in 1895 was ninety-six, and the lowest seventy, the average being about ninety. The highest for 1894 was ninety-six and a half and the lowest seventy-five and a half, the average being ninety and three-quarters. The highest score made by any exhibit of creamery butter for 1895 was ninety-seven and a half, and the lowest eighty-four and a half, the average being 92.36; and the highest score made by any exhibit of dairy butter was ninety-six, and the lowest eighty-eight, the average being 92.38.

The amount of prize money awarded in sections 1 and 2, in cheese and butter classes, was divided as follows: The number of points scored by each exhibitor of cheese over ninety-four points and of butter over ninety-six points were added together and divided into the amount offered for prizes, and this product multiplied by the excess number of points in each case gave the amount of each prize.

This *pro rata* plan seemed to give satisfaction, and in some ways is preferable to the ordinary method, as each exhibitor shares in the prize money if his cheese or butter scores up to the standard.

The judges last year were A. F. MacLaren in cheese and W. P. Hibbard in butter. The Dairy Department of the Western Fair was in charge of Mr. John S. Pearce, one of the representatives from this Association last year, and if he will permit me I would like to state that Mr. Pearce is sparing neither of his time nor energy in making the dairy display one of the most important on the grounds. The accommodation provided for cheese is ample, though that for butter might be improved. We learn that there is a movement in this direction, and that some change will be made in the dairy building before the next fair.

Dairy Test at Guelph.

A dairy department was inaugurated last year in connection with the Provincial Fat Stock Show, held at Guelph on December 10th, 11th and 12th. The total prize money was $135, made up of a grant of $50 from this Association, and a like amount from the Agriculture and Arts Association, and donations of $25 and $10 respectively from your President and Secretary. The regular prizes were supplemented by a number of valuable special prizes given by the *Farmer's Advocate*, London; John S. Pearce & Co. London; F. W. Hodson, Superintendent of Institutes; The *Sun* Publishing Co., Toronto; and the Bryant Press, Toronto.

The prizes were given for dairy cattle only, and a milking trial of dairy cows carried on which proved to be one of the interesting features of the show. A twenty-four hours test was conducted according to the standard rules for the British dairy shows, with the exception that constitution and conformation were taken into account. The following was the scale of points used: Twenty points for constitution and conformation; one point for each pound of milk; twenty points for each pound of fat; four points for each pound of solids (not fat); one point for each ten days in milk, after the first twenty days (limit, 200 days); ten points shall be deducted from the total score for each per cent. of fat below three per cent. of fat in the milk."

There were classes open for Shorthorns, Ayrshires, Holsteins, Jerseys or Guernseys, and grades. All these breeds were represented excepting Jerseys and Guernseys. There were eleven cows competed in all. This is not as large a number as some of the more enthusiastic promoters of the show would like to have seen, but considering the time of the year, and the fact that it was the beginning of the Dairy Department, there were as many as could reasonably be expected, and I have no doubt that if the Dairy Department is continued another year there will be a much larger display.

The results of the test are tabulated as follows:

Name of cow.	Breed.	Owner.	Points of constitution.	Pounds of milk.	Average per cent. of fat.	Pounds of fat.	Pounds of solids (not fat).	Total points scored.	Awards.
Lady Bright	Shorthorn	H. Wright, Guelph	15.4	45.31	2.55	1.16	4.14	102.07	1st
Calamity Jane	Holstein	A. & G. Rice, Currie's	18.1	69.18	3.16	2.09	6.4	153.06	1st
Eunice Clay	"	" "	17.2	40.68	3.2	1.30	3.22	108.26	
Aaggie Ida 5th	"	Wm. McClure, Norval	16.2	35.53	3.5	1.24	3.11	99.97	
Aaggie Lady of Loraine.	"	" "	15.1	47.19	3.45	1.65	4.33	116.11	2nd
Jean Armour	Ayrshire	W. M. Stewart (jr.) & Son, Menie	15.9	31.18	3.75	1.17	2.76	87.62	2nd
Ada	"	W. M. & J. C. Smith, Fairfield Plains	17.3	46.31	3.9	1.79	4.09	119.07	1st
Gusta	"	W. M. & J. C. Smith, Fairfield Plains	15.6	31.13	4.15	1.29	2.95	87.53	
Blue Bell	Grade	D. Keleher	14	21.07	4.8	1.01	1.96	68.61	3rd
Rose	Shorthorn grade	Jas. Bowman, Guelph	14	46.5	3.8	1.77	4.23	113.82	1st
Nancy	Grade	Hugh McDougal, Guelph	15	24	4.6	1.10	2.26	81.04	2nd

The first sweepstakes prize was awarded to Calamity Jane, a Holstein cow, which gave 69.18 pounds of milk in the twenty-four hours, and the second sweepstakes to Ada, an Ayrshire cow, which gave 46.31 pounds of milk. Those in charge of the test were G. E. Day, B.S.A., Lecturer in Agriculture at the Ontario Agricultural College, Guelph; T. B. Millar, your Inspector, and your Secretary.

In the prize list it is urged that the judges make some suggestions as to how a winter dairy show may be best conducted and made most instructive. I have neglected to consult the other judges in this matter, but will take it upon myself to make the following suggestions:

(1) Interest every dairy breeders' and dairy association in the show, and get them to contribute towards and take some part in arranging the prize list.

(2) Endeavor to have prizes as large as possible, as exhibitors of dairy cows are under considerable expense, and are loth to go to much trouble unless the prizes are worth trying for.

(3) Prizes should be given for male animals as well as for females.

(4) It would be more serviceable if the dairy test were conducted for a week or ten days, and the amount of feed consumed taken into account; but as this involves considerable time and expense it is not practicable at a three-day show.

(5) Have warm, comfortable buildings for all stock, and especially for milch cows. It would be better to have a separate room or building for dairy cows, so that they could be kept quiet during milking.

(6) If dairy products are to be shown, a well-ventilated and roomy building, in which the temperature can be controlled, should be provided; and it should be detached, if possible, from the building in which the stock are kept.

(7) Have some of the best and some of the poorest samples of cheese and butter cut up and their good and bad qualities pointed to exhibitors and others interested.

(8) It would be instructive to have one of the judges give an exhibition of milk testing and the judging of dairy cows by conformation during the show.

(9) Where practicable, it would add to the interest and value of the show to have an exhibition of butter-making, and if possible a competition between butter-makers as is practised by some of the great dairy shows in Britain.

All of which is respectfully submitted.

Your obedient servant,

J. W. WHEATON.

London, January 6th, 1896.

The meeting then adjourned until the evening.

FIRST DAY—EVENING SESSION.

The Opera House was well filled at the evening session. President Pattullo again occupied the chair. The first gentleman called on was the Mayor, who was present as the representative of the town. A number of songs were sung during the evening and were much appreciated.

ADDRESS OF WELCOME BY THE MAYOR.

Mayor Cole expressed the pleasure it gave him to be present at the nineteenth annual meeting of the Dairymen's Association and welcome the delegates to Woodstock. He referred to the rapid advance of the dairy industry in Canada, and especially in Ontario. This was owing to the interest taken in the industry by distinguished gentlemen, some of whom were on the platform this evening. The subject of good roads was one, he thought, which was intimately bound up with the prosperity of the dairying industry. With good roads the cost of the output of dairy products could be reduced by a considerable sum, and thus put money in the pockets of those who were engaged in the business. It was a matter of satisfaction to him and to all the people of Woodstock to know that the Association had received its beginning in the county of Oxford. The Mayor closed with extending a cordial welcome and the freedom of the town to the members of the Association.

President PATTULLO spoke for the Association in accepting the courtesy of Mayor Cole, and expressed the assurance that the present meeting would be the greatest and most influential in the history of the Association. Mr. Pattullo said that considering the magnitude of the industry, which was under the direct care of the Association, it was not surprising that the good people of Woodstock should extend to the members such a cordial greeting. "I have now very great pleasure in introducing to you the first gentleman whose name is on the programme to-night, and I am quite sure that he will receive the same cordial welcome from you that he has had on every other occasion on which he has appeared before Canadian audiences. I refer to our old and beloved friend, Mr. John Gould, of Ohio.

A VOICE FROM OHIO.

Mr. GOULD, in beginning his address, said he was only too glad to come to Canada again, as he had a great many friends here. He elicited much laughter by saying that he had come as a messenger of peace, and he would not be greatly put out to find himself held as a hostage. He could imagine no more pleasant fate than to be seized by the cowboys of Canada and held captive till the war is over. Continuing, he said: "I believe I told you when I was here last year that the dairy business was going to be better in the year to come. I believed it. I am trying to believe it now, but unfortunately it has not proved as I had wished, and so to-night I am not going to set up as a prophet again. I am going to take what comes in the future and bless the Lord for it. We are to-day a sort of prisoners of hope. We are hoping that the dairy business is going to be better, but whether it is better or worse you will find out that the dairying country—the country that has once adopted dairying—will always stay by it. The dairy has always and ever will be a factor that brings up a one-sided agriculture and balances it and sets it into true motion again. At least it is the cow that comes in and brings up the agriculture and puts another money crop into the farmers' hands. It has been the history of the States from the Hudson River to the Pacific Ocean. When the land has been wheated out, then the cow has come in to bring the farmer back to prosperity again. When the land has been corned, then the cow has not been made into corned beef, but has been brought in as an agent to turn corn into money." Mr. Gould went on to say that more money was received for butter shipped out of the state of Iowa last year than all the ore the silver mines had produced; yet Congress never got excited once about the dairy interest of Iowa. The dairy industry was spreading all over the country. It had been introduced down in the cotton belt and they were going to make Georgia a prosperous State just as his friend, Hon. John Dryden, was going to start dairying in Algoma. (Laughter and applause). Sheep in his country had gone the way of all the earth, and horses selling for $6 a dozen had knocked the bottom out of the live stock trade. There was no money in beef, even raised on the plains at little cost. Yet, despite the low prices, they

found the dairymen to-day sticking just as tenaciously to the trade as they did, and a dairy cow sold for money. Why? Because that dairy cow, despite low profits, brought in money 365 days in every year to the farmer, and there was not another thing on the farm that did it. The farmer who was not in the dairy business in the United States would soon be in bankruptcy or going to live with his father-in-law. (Laughter). "What we dairymen have got to do," said Mr. Gould, "is to bring in new forces and new resources; and whilst we cannot get more than twenty cents a pound for butter, and eight and nine cents a pound for cheese, we can get down a little closer to the ground. I do not mean that we must use more economy We are economizing all that is necessary, but we must begin to utilize forces that we have never utilized before, and it is possible even with the lower prices that we shall get as much money out of the dairy as we got with the higher prices."

The PRESIDENT: Mr. Gould has just whetted our appetite for what is coming to-morrow. I feel sure that all of you who have heard him to-night will want to hear him make his real speech, or rather his series of speeches, to-morrow and the next day. I think that Mr. Gould was a little reckless when he got off his little shot at our Minister of Agriculture in reference to starting that dairy school up in Algoma. I would like to say, with reference to that school, that I am a little sensitive on that point. I claim to be a sort of half godfather to that school, because I have been advocating something of the sort for a good many years. I think one of the best things Mr. Dryden ever did was to start that dairy school up in Algoma, where there is a great deal of fertile land. There are very few people in this Province who realize the enormous resources of northern Ontario. We speak of the "wilds of Algoma," when as a matter of fact there are enormously rich valleys up there, and I am quite sure that that little model dairy farm of Mr. Dryden's will do a very large amount of good.

Hon. John Dryden, on coming forward, was greeted with much applause.

UNITY AND DETERMINATION OF PURPOSE.

Mr. DRYDEN said that he observed, on looking at the audience, that he would have to address some who could not be considered either dairymen or dairymaids, and he felt very much like one of the Governors of Texas, who was asked to speak to the inmates of the State prison, and who after trying several unsatisfactory modes of commencing his speech, recklessly launched out as follows: "I don't care what you are; I am glad to see so many of you here." He was on that principle, glad to see so many in the audience that night, and he was especially pleased to see his friends from the United States. When he first saw the programme of the convention and perceived that the names of Mr. Gould and Mr. Louis were on it he had said to himself, "These men will never be present. They will never come with the thick war clouds hanging over us." But when he arrived this evening at the station almost the first man whom he had met was Mr. Gould, and very glad he was to grasp his hand. The fact that Mr. Gould should be here would indicate to the speaker that he would not again vote for Mr. Cleveland.

Mr. GOULD: I never did.

Continuing, Mr. DRYDEN said: "I am reminded that both of these gentlemen are engaged with the dairymen of this country in a warfare after all. It is rather a pacific strife. They are stimulating strife for the purpose of building up each of our countries to make humanity better—not for the purpose of destroying, as the policy announced by President Cleveland would do. I am always glad to meet representative dairymen from the Republic, and while in this country we will try to get ahead of them in producing better products, still we always welcome any advance they may make just as they will welcome any advance that we may make in this respect. Something has been said about Algoma. I am quite willing to wait and bide my time. By and by you will see what

we have done up there. Some of you have no idea what Algoma is able to produce of those things which go to make dairying a success. I suppose you will scarcely believe that timothy sown on May 20 on this little farm in Algoma had reached about two and a half feet high in August, and that I cut some of it in August and it was exhibited at the Toronto Industrial Fair. Where we can produce grass, as we have already proved we can do, I am quite sure we can make dairying a success, because other things will grow where grass will grow. My friend the Chairman tries to take a little credit for the establishing of what he calls a dairy school in Algoma, and he says he is so glad that I established the institution. I do not like to disturb his sweet thoughts, or take anything away from him, but when I tell him that I have not the slightest idea of starting a dairy school there I do not know what he will say. We simply call it a pioneer farm. What is it for? For the purpose of showing the people of this country—showing the world—that we have good agricultural land in that district of Algoma, and that people have been riding over it and past it on the C.P.R. to get into that wonderful province, Manitoba, and have not dreamed of the thousands of acres of fine land that exist and the wonderful resources of that part of Ontario. I am quite sure that in a few years we shall have a thriving settlement and town near Barclay Station, where the Government farm is. I am not here this evening to undertake to give instruction to men who I know are greatly my superiors in reference to dairy matters; I have rather to come to bring greetings and good wishes from the Ontario Government, which I have the honor to represent on this occasion. I would like to say that my honored and trusted Chieftain, Sir Oliver Mowat, will be with you himself on Thursday next. (Applause.) Our Government, Mr. President, are justly proud of the use this Association has made of the small sum of money which the Legislature has granted it for a number of years past. I believe that during all this time the money has been spent with due regard to wisdom and economy. I believe that I am right in saying that good value has been received for every item of expenditure which has been made in this way, and that the public generally have been able to reap abundant benefit from what you have been able to do through the work of this Association. No class of our agriculturists has been able to reach so high a position with their products as have the cheese makers of the Province of Ontario. Now this is due, I suppose, to a good many reasons; but as I look on the record that has been made I attribute it largely to three or four principles that have actuated their work from the beginning. I would like to suggest two or three of these. The first is unity. The cheese-makers have realized from the beginning the truthfulness of the adage that in unity is strength, while the contrary is just as certainly true. Separation always means weakness. They have had unity of purpose—unity of purpose in endeavoring to seek the very best methods that can be found for the manufacture of this product. Not the cheapest methods, for that has not been the idea; but unity of purpose in selecting the very best methods, having due regard to the quality of the manufactured article. I believe that in the early years of cheese-making in this country an attempt was made to adopt a method which would have produced a very inferior article—the attempt was made to take away from the milk certain of its properties, and substitute others that were cheaper, and put on the market a decidedly inferior article. It is easy for us now to see that that practice would have been disastrous—that it would have destroyed the market that we now hold; but the men of that time saw all this beforehand, and the result was that by unity of purpose and unity of effort the thing was stamped out, and it never obtained a foothold in this country. You and I are rejoicing to-day because it did not. I believe that in the United States—in some of them, at all events—that policy was adopted. Good men on the other side see the folly of it to-day, and would fain do away with it, and change it, and put a better state of things in vogue, but they are not able to do so, and the result is that they are suffering on account of it. Now, you have not only had unity of purpose, but you have had unity of methods as well. It is singular when we look to see how almost the entire Province has been united on the same method. Unity of purpose and unity of method have brought about practically a uniformity in product, so that when the goods are marked by the name of our country, the purchaser understands perfectly what particular quality he is likely to receive. The second principle that

has actuated all that has been done has been co-operation. It is manifest that if you are to have the best goods, the best products, it must be by the exercise of the best skill. Some good people who are listening to me now will no doubt think it is a very easy thing to manufacture cheese and butter—a simple process that anybody can learn. I remember my friend, Mr. Ballantyne, once saying that anybody could learn to make butter in half an hour. To day the authorities at the Agricultural College say they can find ten good cheese-makers where they can find one good butter-maker. It is not an easy thing to make fine quality cheese or gilt edge butter. It is manifest that you cannot exercise the proper skill unless you have proper buildings, proper machinery, and proper equipment all round. These cannot be furnished by a single individual, because it would not pay a single individual in the ordinary way to furnish such equipment as is an absolute necessity. The result is that the cheese-makers of this country have been willing to co-operate—to work together in this regard—and have united together to put up the buildings and get the machinery, and combine their raw material. And so in this way the very greatest skill can be used, leading to the highest quality which it is possible to produce. I know there have been difficulties in the way of carrying out this scheme, but the utmost unity and harmony have prevailed, and they have led to the very best possible results. Then you have had co-operation in another thing. You have, by co-operation, been enabled to give to your people the best instruction in reference to dairy matters. You have recognized just what I had the privilege of saying to the fruit growers in this city recently, that ignorance means failure in this industry just as certainly as it does in every other agricultural industry, and that knowledge means success. At all events knowledge is the first step towards success, and realizing that, you have joined together in order that you might send about the country instructors, for this reason, that you did not desire that any of your people should manufacture inferior goods, and so place them on the market in competition with that which was vastly superior. There always were and always will be men who are willing to take a little temporary gain, notwithstanding that they know it will mean future loss. A man, for instance, will undertake to deceive another; he will undertake to put false goods on the market; he gets temporary gain, but in a little while he destroys his market, and the result is failure. It is because you have by co-operation been able to prevent that altogether, and given such instruction and aroused such enthusiasm, that you have obtained the hold which you have upon the English market to-day. Another principle which has been in operation is one that is usually found among Scotchmen at any rate, and that is perseverance. The position which the dairymen of this country have attained has not been reached in a day nor a year. It has been done by patient plodding all these years, commencing at the very lowest round of the ladder at the very beginning, and going up, step by step, holding what we have gained and reaching forward constantly to that which is better and higher, so that we are able now to say that we have reached the topmost round of the ladder. That has been accomplished by constant and continual perseverance. We know that mistakes all along have been made, that failures have occurred, but these mistakes and these failures did not prevent the cheese-makers from going forward. These mistakes and failures were investigated, efforts were made to find out what caused them, and what ought to be done to remedy them, and the result is that by persevering effort and plodding industry, these very failures and mistakes have only led to something which has been still higher. Then the other principle which I want to mention is determination. I think as I read the history of this Association that it has been following this motto: "We *will* succeed; we are *determined* to succeed; we *can* place our goods on the best market in the front place; therefore we *will*," and so it commenced with the pluck which is—I don't want to frighten my American friends now—the true characteristic of the Briton, the determination to win. Failures have only led to a stronger determination to succeed. How is this to be done? Not, I submit, by a great deal of bluster and noise; not by creating a great sensation in the country and saying, "We have done this." That is not the way it will be done. I find some people inclined to take that method. That is not the way it has been done. It has been done by the patient investigation and study of the details of the business; hours, and weeks, and months of patient investigation

in order to find out what was needed to make a better product than before. By the exercise of good judgment and the acceptance of advice, because we have always been willing to receive sound advice—whether from Canadians, Englishmen or Americans—and using this advice to the very best advantage, we have been able to succeed. New discouragements have presented themselves. We are confronted now by a new kind of obstacle, and that is lower prices for those products which have been steady during all these years. We cannot say that in the past the prices for those products have been so very high. It has seemed to me that all the farmers got was merely good wages for the work in which they were engaged; but it was steady, and, as Mr. Gould remarked, returns came in 365 days in a year, and so it was considered to be profitable But now we have lower prices.

The fact is that in all industries the almighty dollar is more difficult to obtain now than it was, and you know that farmers cannot get the prices they used to get ten, or even five years ago. Whether it is too much cheese or too few dollars, I will leave for somebody else other than myself to solve; but the fact is true that we have now to receive less prices for the cheese than we did a little while ago. Now, what are we going to do? Are we going to say, "Give it up; drop it?" You cannot say that. That will not be the answer. The same British pluck, the same determination, the same unity of purpose will be manifested now as they have been manifested in the past. As Mr. Gould says, we cannot economize any more, but we can get down closer to the ground, and then we will probably be as successful in the future as we have been in the past, even with the lower prices. There are two or three things that we may be able to do. Ask yourself this question, Can I find cows to put into my stable that will produce more milk on the same feed than the ones I have been using? I think the answer in this country would be in the affirmative. There are men who cannot do much better than they have been doing, but there are hundreds and hundreds of men in this country supplying milk who have not studied this question, and who are unable to realize that it is possible to put two cows in the stable to do the same work that three are doing now. That is one of the things that we have to get at. If a cow does not pay its board and something more, it does not matter how broad it is or how long a pedigree it has got, it ought to be discarded and a better one put in the place of it. This can be done, but before it is done I point out to the dairy associations of this Province that it will be necessary to give the people a lot of information, because I can tell you there is a good deal of ignorance in regard to the cow. How many people think that a cow is a cow, and that is all? Some people are very anxious to get a cow with a pedigree. That is another mistake. You can't get a good pail of milk out of any pedigree. You will have the privilege of nailing the document up on the post behind your cow, but it won't fill the pail. Some of these will have to be discarded. I often think what a pity it is that some twenty years ago or so men with brains did not undertake to make what I shall call a dairy breed out of our own Canadian stock. These cows really had pedigrees, but you could not put them on paper. They were good animals for dairy purposes. One of my Scotch friends was telling me that he would have had no difficulty in finding fifty cows possessing all the points that a cow ought to possess. In Quebec, I believe, some attention has been paid to this. They have what they call their own Canadian cattle, and they are all extremely good. The same thing might have been done in this Province, and especially in Western Ontario, if somebody had set about it. That is one of the ways of lessening the cost of production, and giving ourselves a return equal to that which we had when the price of cheese was higher. The other way is by lessening the cost of the feeding. In this connection may I suggest that our farm superintendent at the Agricultural College is just now laboring with this problem to see if he cannot find such a ration that will enable us to keep our animals at a much less cost than we have been accustomed to keep them. I know how our ordinary cattle of the country have been kept, and I know how expensive it is. I know how much less it is possible to keep these animals. We are not through with our experiments at the College. Some progress has been made. You saw the account of what Mr. Rennie had done in reference to the feeding of steers last

year. You saw about the feeding of horses on the farm when they are idle. I know they are kept in the pink of condition, and Mr. Rennie claims that last winter he kept them on eight cents per day. He expects to reduce it this year to seven cents. When he claims to be able to keep the swine at the College on two cents a day per head outside the slops which they receive from the College, you will see how much can be done in this direction. We have got, as Mr. Gould says, to get down closer to the ground, and try and find if some additional details cannot be found to throw light upon this point. In these two ways we should be able to lessen the price. And then we must make the products better than we have ever made them before. You say it is not possible. I am not so sure about that. I believe it is possible. What would be the result if all the dairymen of the world were, from this time on, to make the best product that could be made? Do you think we would have too much of it? It does not increase the number of pounds when you improve the quality, but it increases the demand. There is not a man in this audience who would not consume more cheese if it were better than it is. What can be done? I do not know that anything better can be done than by continuing the education which has been given. We have schools with the best equipment that is to be found on the continent—the best buildings and machinery and utensils, and a good staff of teachers. We are able to give exactly the education that is needed on this line. The trouble is that a number of our people seem to think they do not need education, but I am glad to say that the cheese makers, at all events, are taking advantage of the opportunities that are afforded them in this direction. I was glad to hear from one of the instructors the other day that one of the young men who attended the dairy school at Guelph went into a factory this summer, and that his cheese this year have sold from one-eighth to one-quarter of a cent higher than anybody else's cheese in that section, and that the last he sent out brought half a cent a pound more than other people's. What one does in this regard, there is no reason why another should not do. I would like to point out that we have added to our equipment at the Agricultural College, so that our teachers and professors there are able to carry out experiments the year round. We have not come to definite conclusions and fixed everything in connection with dairying yet. My friend Gould knows a lot about it, but I have no doubt there are some things that he would not give a definite answer to. These things ought to be settled, if they can be, by experiments. That is what our teachers and professors are endeavoring to do at the Agricultural College. When these experiments offer to lessen the cost of production, we need not be afraid that we will not be able to hold our own. These dairy goods will be in demand so long as the world exists. What you and I want to do is to unite our forces to produce the very best goods that anybody produces, and then we will get the best of the market, whatever it is. It does not matter who comes into competition, we will be able to hold our own. This cannot be done in any other way than the way I have been suggesting. I want you to know that so long as I hold the position that I now hold, I mean to carry on that work." Mr. Dryden here gave an illustration of the effect of instruction. Two ladies, he said, were discussing the advisability of attending the lectures delivered in connection with the travelling dairy. One said she was not going; she knew all about it, and besides, the Grit Government had sent the dairy out. The other did not care whether it was a Grit or Conservative affair, she was willing to take advice and instruction. She attended the lectures, and learned a way of making butter that was better and easier than her own, and from that time on she commenced to produce an improved article. It was not long before the two women went again in company to the market. He (Mr. Dryden) knew the man who purchased the goods from the women, and that was how he was acquainted with the facts. When the lady who had been to the dairy school presented her goods, Mr. P————, the purchaser, said, "I will give you three cents a pound more for that butter." The other woman was delighted on learning that the price of butter had gone up, but was rather taken back when, on remonstrating with the buyer for offering her less than her friend, he said, "My good woman, when you make just as good butter as that (pointing to the goods of the other woman), I will give you the same price, but not until." That, said Mr. Dryden, was the kind of teach-

ing that stuck. "These are the only means," he continued, "I have to suggest at the present moment to give us relief, supposing that we are called upon to take less prices for our dairy products, but I believe they are means which will be effective. At any rate, we shall keep it up, and manifest the same pluck and perseverance as we have in the past. Before I sit down I want, with all my heart, to wish this Western Dairymen's Association greater progress, greater success and greater prosperity in the new year upon which they have entered than in any other year of their history."

The PRESIDENT remarked that he thought he had paid Mr. Dryden a very high compliment when he had alluded to the Algoma farm as a dairy school, because if it was a farm run by Mr. Dryden it would be a model farm, and consequently a dairy school; it would be one that not only taught by theory, but by example. He claimed the same thing for the Western Dairymen's Association. With all due deference to Mr. Dryden, he thought the Association was the best dairy school in this country, and he would not have considered it a libel in the least if Mr. Dryden had alluded to it as a dairy school. Referring to Mr. Dryden's remarks as to the Government grant to the Association, Mr. Pattullo said that he could only say, speaking for the directors, that not a single dollar of Government money had been misspent by the Association. They had felt conscientiously about the matter, and had made the money go just as far as possible. He complimented the Government on the fact that when they found that an Association was not giving full value for the money appropriated they stopped the grant. A case in point was the Agricultural and Arts Association. The Association had done an enormous amount of good, and he did not wish to reflect upon it, but its usefulness had been lessened because its place had been taken by another organization. The Government had stopped the grant in that case, and the action had met with the universal approval of the farmers of the country. He was sure every member of the Dairymen's Association would agree with him that whenever they ceased to give good value for the money which the Government gave them the grant should be stopped at once.

The next speaker, the President said, was Mr. Theodore Louis, of Wisconsin, and, as it was the first time he had visited this country, he would call upon Mr. Gould to introduce him to the audience.

Mr. GOULD responded by telling his hearers how he came to meet Mr. Louis first, and relating something about his life. He concluded thus: "It gives me great pleasure to-night, as I stand before this Canadian audience, to introduce my old comrade in arms, Theodore Louis. When you see Theodore you see the noblest old German that was ever galvanized into a Yankee."

Mr. LOUIS when he came forward was loudly applauded, and he entertained the audience for half an hour by describing, in graphic language, several thrilling incidents that had taken place in his life in the Rocky Mountains fifty years ago.

The convention then adjourned until next morning.

SECOND DAY—MORNING SESSION.

The PRESIDENT took the chair at nine o'clock, and the business of the meeting was commenced at once. The attendance was very large. Many farmers had driven in from the surrounding country, and the trains brought in large numbers from all parts of the Province, the east being represented as well as the west. The ground floor and first gallery of the opera house were filled with a most attentive audience.

The first business of the session was the reading of the Inspector's Annual Report. Mr. Millar's statement was as follows:

REPORT OF INSPECTOR MILLAR.

GENTLEMEN,—I take pleasure in presenting to you my fifth annual report as Instructor and Inspector of this Association.

The work of instruction was taken up during the months of April, May and the first part of June. The work assigned to me was similar to that of last season, namely, visiting central factories to give instruction in cheese-making and in using the Babcock milk tester.

In this connection I visited the following factories on the dates mentioned opposite each:

Verschoyle, April 9 and 10.
Harrietsville, April 12.
Northwood, April 15 and 16.
Bright, April 17 and 18.
Elma, April 19 and 20.
E. and W. Oxford, April 22 and 23.
Thamesford, April 24.
Nilestown, April 26 and 27.
Norwich Junction, April 29 and 30.
North Brant, May 1 and 2.
Nixon, May 3 and 4.
Attercliffe Station, May 6 and 7.
Forest, May 8 and 9.
Warwick, May 10 and 11.
Cedar Springs, May 13 and 14.
Glencoe, May 15 and 16.
West Lorne, May 17 and 18.
Blytheswood, May 20 and 21.
Harrow, May 22 and 23.
Lucan, May 27 and 28.
Ripley, May 29 and 30.
Harriston, May 31 and June 1.
Burgoyne, June 3 and 4.
Shelburne, June 5 and 6.
Stayner, June 7 and 8.
Newmarket, June 10 and 11.
Wyebridge, June 12 and 13.

Thus covering the country from the Detroit river on the west to Niagara on the east, and as far north as Penetang'.

During this course of instruction 172 cheese-makers took advantage of these meetings, an increase of fifty-two over that of last season, besides a number of prominent dairymen, as presidents of factories, managing directors, salesmen and patrons.

After completing this part of my work, I commenced the work of instruction and inspection, visiting factories according to application. There were a few applications that I could not attend to at the time specified, consequently these were cancelled.

During the season I visited 101 factories, making in all 127 visits. Our Secretary, Mr. Wheaton, visited two factories for me in the western part of the district, and Mr. White, of Hawkesville, one in the northeast.

The factories that I visited are situated in the following counties: In Oxford, eleven; Middlesex, seventeen; Lambton, four; Essex, three; Kent, three; Elgin, one; Norfolk, eight; Haldimand, one; Wentworth, two; Brant, four; Waterloo, two; Wellington, three; Perth, seventeen; Huron, three; Bruce, ten; Grey, two; Simcoe, four; Dufferin, five, and York, one.

I tested 2,436 samples of milk with the Quevenne Lactometer and 806 samples with the Babcock milk tester, making a total of 3,242 tests. Of these one sample tested ⅞ of 1 per cent. butter-fat; two samples between 1 and 2 per cent.; sixty-five samples between 2 and 3 per cent.; 687 samples between 3 and 4 per cent., and only three samples over 5 per cent. butter-fat. The richest sample I received for inspection tested 5.4 per cent., and the poorest sample .8 per cent. butter-fat. I could not take the lactometer reading of the poor sample, as it was a composite test that had been kept for me to inspect. The rich sample gave a lactometer reading of 34.6, butter-fat 5.4 per cent, solids not fat 10 per cent., total solids 15.4 per cent.; water, 84.6 per cent. This milk was delivered at a factory in the county of Bruce on the 22nd of October. A sample taken from the vat on the same date tested 4.4 per cent. butter-fat, which is the highest test I have ever made of milk taken from a vat.

Samples of milk taken from the vats during the months of April and May tested from 3 per cent. to 3.3 per cent. butter-fat; in June and July from 3.1 per cent. to 3.5 per cent.; in August and September, from 3.5 per cent. to 3.9 per cent.; October from 3.9 per cent. to 4.4 per cent., only one factory testing over 4 per cent. butter-fat. It

will be noticed that the average percentage of butter-fat is lower than in former seasons. This I believe is due to the very unfavorable season. I tested several samples of milk from herds that tested less than 2.5 per cent. butter fat. These tests were made in the month of July, when the cows were suffering from the scarcity of food and water.

In almost every section I visit I have the same question asked me, "How do you find the average in other sections?"—that is, the average pounds of milk required to make a pound of cheese. And when I reply that I find the average in every case to be higher than usual, then the question comes, "Why should it be higher? Our cows are giving scarcely any milk and consequently it should be richer in butter-fat." But this is not the case, as the above-mentioned tests show. Some patrons claim that it is on account of more tampering being done with the milk sent to cheese factories This, however, is not the case, as there was a great deal more tampering done a few years ago than at the present time. Others say that the cheesemakers are losing too much fat in the whey. This I claim to be wrong also. I have tested a good number of samples of whey during the past season and found the average loss to be $\frac{1}{10}$ of 1 per cent. butter-fat. There are several reasons for the high average, and I will endeavor to point out a few of them. The very hot weather during the first ten days of May and the wonderful g owth at that time will be remembered by all present. Then the severe frosts which took place on the 11th and 12th, which cut every green leaf and blade, destroyed the hay crop all over the country, and seemed to destroy a good deal of the nutriment of the grasses and the drouth setting in early in June the pastures never recovered, and instead of having an abundant supply of food, as a good many had expected, the cows scarcely got enough to keep them aliv·, let alone food for the milk supply. Hence a small quantity of milk, and that in many cases of a poor quality. This season has been noted for sudden changes from heat to cold and *vice versa*. All these things have a tendency to the production of a poor quality of milk. Then, owing to the low prices for cheese, especially during the first part of the season, the patron was not making as much out of his cows as he had expected, and the result was that he grew careless about attending to the milking of the cows. They were milked whenever it was convenient, the milk very often being poured into the milk can without straining. As for aerating it, he said: "At the present price of milk it is not worth the time it would take to do it," and so it remained in the can just as it had been milked until the morning mess was poured in in the same manner and was taken to the cheese factory. The cheesemaker might find fault with the condition of it, yet in ninety-nine cases out of a hundred he would accept the milk instead of rejecting it. Then another reason is the recent change in the system of weighing cheese for the export trade, viz., one-half pound extra on each cheese. A number of cheesemakers also have the habit of ripening or maturing the milk too much before setting. By doing so it requires more milk to make a pound of cheese.

In summing up I will give briefly four reasons that might cause the high averages of the the past season: 1st, the unfavorable season; 2nd, want of aeration; 3rd, change in the system of weighing cheese; 4th, maturing milk too far before setting. The patrons can remedy the first two causes, the first by supplying suitable fodder for their cows, and the second by giving due attention to the care of the milk and seeing that it is thoroughly strained, aired and cooled immediately after milking; also remembering that the morning's mess requires airing just as much as that of the evening. The third I will leave with you, as a great deal may be said on both sides of the question. The cheesemaker must remedy the fourth if he would keep up the reputation of his factory and his own as a cheese-maker.

I visited the farms of twenty-four patrons to get samples of milk as taken from the cows, and twenty-one of these appeared before magistrates charged with tampering with the milk sent to factories, eighteen of these pleaded guilty, the other three were tried and convicted. The fines ran from five dollars to thirty dollars and costs. One appealed to the General Sessions at Woodstock, but at the time of the court did not appear, so the appeal was dismissed with costs. Nine of the charges were for diluting with water, ten for taking cream, and two for keeping back strippings or the last part of the milking.

Three of these were in the County of Oxford, three in Middlesex, one in Kent, four in Perth, one in Waterloo, three in Huron, three in Bruce, one in Grey and two in Dufferin.

Out of the hundred and one factories I visited there were seventy-nine Babcock milk testers in use. The influence of these upon some of the most unprincipled patrons is quite noticeable, and in a few years I hope to see them in use in every factory in the Province, and to see every factory paying for milk according to quality. Thirteen factories I visited were paying for the milk according to quality. Altogether I think there is about the same number of factories paying for milk by quality as in former years, but the question arises: If the system is right why does the number not increase? Various reasons might be given for this and I shall mention a few. In some cases factorymen adopt this system before they have educated their patrons along this line, so that not knowing anything of the test, all sorts of stories are soon circulated amongst the patrons. Some claim that it required the skill of a chemist to successfully make the test, and when a slight variation takes place in their weekly test, instead of attributing this to their cows they are at once covinced that some mistake has been made in the test, and that they are being cheated. The result is that there is general dissatisfaction at the next annnal meeting, and the system is voted out. Again, one patron says, "Mr. Jones takes good care of his cows; he has a fine herd; he feeds them well and sees that they have an abundant supply of good water; he sends the milk to a factory where they pay for it according to quality and the milk tests 3.4 per cent. butter-fat. His neighbor, Mr. Brown, a rather shiftless farmer with a poor herd of ill-fed cows, sends milk to the same factory, and lo! his milk tests 3 8 per cent." But notice that Mr. Brown only gets about fifty per cent. of the milk per cow that his neighbor, Mr. Jones, gets, yet farmer Jones is dissatisfied with the result of the test. I have had just such a case come under my notice, and it took a good deal of explaining to get Mr. Jones to see that he was getting more pounds of butter-fat than his neighbor, although his test was a fraction lower. Again, the owner of a private factory adopts this system and as soon as the neighboring factorymen hear of it, they are off into his territory to canvas for patrons, and tell them what a farce this Babcock tester is; that it will rob the patron to make the cheeee-maker and manufacturer rich, and the result is that this progressive dairyman has to go back to the old system of pooling milk or go out of the business. Other factorymen while claiming that the system is all right drop it on account of the extra expense connected therewith; the cheese-makers refuse to do the testing unless paid for doing so, and so the company must manufacture cheese as cheaply as their neighbors or lose patronage. This system will never be a complete success until it is adopted by every factory in the Province.

The great majority of the factories that I visited were in good order, well kept, clean and tidy, but I am sorry to say that a number were positively dirty, with old tumbled-down buildings that were not fit to make cheese in, and the sanitary condition was not at all what is to be desired. It was utterly impossible to make fine goods, as everything about the place was full of the stench. In fact I believe the maker himself must have been 'off flavor," or he would not stay in the place very long. I would recommend that a few barrels of hot lime be kept at every factory to scatter around and under the buildings as it is a splendid disinfectant. At a recent annnal meeting of the Provincial Health Association several interesting papers were read referring particularly to the wholesomeness of milk and its products, and to the sanitary conditions of cheese and butter factories. I am glad that our medical authorities are taking notice of these things and discussing them at their public meetings. It is sure to do much good and I trust the officers of the local boards of health will be diligent in doing their duty and compel managers of all kinds of factories to keep their buildings and premises in proper condition.

Of the factories I visited, seventeen kept the whey, and it was fed to hogs somewhere in the vicinity of the factory. The other eighty-four returned the whey to the patrons, using the milk cans to carry it. This system of returning whey in the milk cans is a

great evil, and hangs like a mill-stone around the neck of the dairy business, and dairymen will never attain to the high point of perfection that is within their reach until the evil has been rooted out entirely. Before we can see the full benefit of feeding the whey at the factories the system must become general. The fact that about twenty-five factories west of Toronto feed the whey at or near the factory does not make much difference in the price paid for our cheese, yet if one and all were following that practice there would be a decided advance in favor of Western cheese. It would not only put thousands of dollars in the pockets of the dairymen each year, but our reputation, which should be of greater interest to us, would go forward in rapid strides.

I had the pleasure of attending the Fat Stock and Dairy Show held at Guelph in December. There were eleven cows competing in the milking test, and a great deal of interest was taken in it. This is a new departure, and is a step in the right direction, and I think will be the means of raising the standard of our dairy herds.

I take this opportunity of thanking the officers of this Association and dairymen in general for the kindness and assistance rendered to me during the past season.

Your obedient servant,

T. B. MILLAR.

The PRESIDENT: I am sure you will agree with me, that the report which you have just heard is a very interesting and valuable one. Allow me to say on behalf of the directors—I am sure I speak for them all—that Mr. Millar has proved a very valuable Inspector. I think he has done his work extremely well. All of you know that he is a thorough-going maker himself, and very competent to fill all the duties of his important position. I would like to hear, with reference to his paper, the views of some of the dairymen in the districts that he has visited. If there is any fault to find with him or with the Association, or with anything, any suggestions of any kind to make, we would like to have them now. I will give you a few minutes for brief remarks.

Mr. BLAYNEY praised Mr. Millar's work, and referred to him as the right man in the right place.

S. R. PAYNE strongly endorsed the Inspector's remarks respecting the necessity of keeping factories clean, and he thought too much stress could not be placed upon the importance of it. He felt that there were a good many factories in which that duty was apt to be neglected. He also agreed with the Inspector in regard to the Babcock test. He had found that that test was a decided advantage to the patrons and cheese-makers, and where it had been introduced in Eastern Ontario it had been kept going constantly. Its use was growing slowly and surely.

The PRESIDENT remarked that they were glad to hear Mr. Payne especially, as he came from the eastern part of the Province.

Mr. PAYNE replied that he was present in order to receive information along the line of the cheese business and creamery work.

The PRESIDENT: I would like to call attention to one thing in the Inspector's report. Although we pay his salary and expenses a great deal of the Inspector's time is wasted in chasing down dishonest patrons who water their milk. I should like to see that stopped entirely. I don't think it makes very much difference now whether a patron waters his milk or not. I don't think we should waste the funds of the Association chasing these people, because you can stop it. The remedy is all in your own hands if you adopt the Babcock tester. The idea of us wasting the government funds paying Mr. Millar to run all over the country looking after dishonest people when you can make it so yourselves that there won't be a dishonest patron in Western Ontario, because whenever he becomes dishonest he hits himself where he is most sensitive—in his own pocket. I propose that, in future, you should ask the directors of the Association to spend the money that they pay Mr. Millar and other inspectors in acting as instructors, and not in acting as detectives, which we should not need.

J. M. SHUTTLEWORTH: It is very important that the products of Canada should be kept at the very highest point. Adulteration discourages honest men. I think it would be wise to appoint a man for the very purpose of investigating all cases where the cheese-maker has found that the milk has been adulterated in any way. It is often a very ticklish point for a cheese-maker who is hired by the patrons to accuse one of them of dishonesty if he cannot prove it directly, and sometimes there is a disinclination on the part of the patrons—even the honest men—to support the cheese-maker, because the dishonest man is one of their neighbors. I would suggest that a man should be appointed for the purpose of chasing down these men, rather than let our own inspector go everywhere and act as a detective.

KEEP WHEY OUT OF THE MILK CANS.

THOS. BALLANTYNE: I have always said pretty much what our President has said to you this morning. You cannot have proper inspection under any circumstances unless it is done by the managers of the factories. Before we had the Babcock tester the means of detecting adulteration were not so simple and so reliable as they are to-day; but even then I held it was a matter of the first importance to look after the milk coming to the factory, and to see, as far as it was possible with the appliances we then had, that we got pure milk, and the Act was so framed to deal with these matters that the privilege was granted the managers of the factory to go to the farm and see the cows milked, and to compare that sample with others. So that you see I believe that we will never have thorough inspection of milk unless it is done by the managers of the factories. The inspector can only visit the factories at intervals. Is there any one of us so simple as to believe that the fact that the inspector might some time in the season drop in on a factory will prevent those that are in the habit of skimming their milk from doing so? I don't think so. With the Babcock tester there is now no difficulty, and there should be no necessity, as Mr. Pattullo says, for an inspector to be hunting up dishonest patrons. We have a cure in our own hands that is perfectly reliable and accurate—no mistake about it. It is as correct as a chemical analysis, but of course I can realize that it is not such a simple matter to get the Babcock tester introduced into every factory. Of course there are some factories at which, if I were a patron, I would not care to have my milk put through the Babcock test. There are some factories where the maker is not capable of carrying out that test—it requires care and knowledge. Our large factories, as a rule, have good men; but there are others where it would be unsafe for the patrons to be compelled to accept the Babcock test. Where there is a competent maker there is no reason why the Babcock tester should not be used. It is the only fair way. There is another point to which the inspector in his report referred, and which is of the greatest importance. I do hope that an organized effort will be made during the ensuing season by which the representatives of the factories will try and adopt a plan to discontinue sending back sour whey in the cans. I speak whereof I know. Every cheese-maker knows my enthusiasm for everything connected with the making of cheese, and I have taken this position that I would not like to take the responsibility of managing a factory where sour whey was taken back in the cans. In the first place, sour whey is comparatively of no value at all for feeding to hogs. I undertake to say that if a man were to divide his hogs and give the dish washings to one half and the sour whey to the other, he would find that they both got on alike. But look at the other side of the question. If you were a citizen of Woodstock, for instance, would you buy the milk that you used for the ordinary purposes of the table from a man who was in the habit of using his cans for carrying sour whey? No; you would indignantly refuse it. It is just as important that the milk for cheese should be clean and sweet. You all know about the drop in prices last spring. You know it occurred when the new cheese came on to the market. There was a good deal of old cheese on hand. I was in England at the time, and had opportunities of testing our cheese that I never had before.

The customers with whom I had dealings had a great many factories' make on hand that I had shipped. I had a memorandum with me of every cheese and every factory, and all the circumstances. On the examination of these cheese what did I find? I found that all cheese that had been shipped from factories where the whey was not taken back were in perfect condition; but, on the other hand, the cheese shipped by factories which returned the whey in the cans were in almost every case stinking. I say that unreservedly. When the cheese are first shipped from this country the bad flavors have not had time to develop, but when they have been kept by the dealers for some time, as they often have to keep them, these flavors develop, and you can scarcely realize what vile cheese is the result. I have been almost frightened to buy cheese where the whey is taken back from the factory. In the neighborhood of Woodstock there are a number of factories that do not do it, and the cheese of these factories is always in demand, and always sells at a premium. Buyers always try to get hold of that cheese. But you can't build up a reputation for a whole district on two or three factories. I do hope that some system will be adopted during the ensuing season by which this practice will be discontinued. I think one representative should be selected from each factory to meet and try and agree upon a plan. Let us do our best to improve the quality of our cheese, and I know of nothing that would assist toward this end more than paying by the Babcock tester, and discontinuing the filthy practice of sending home sour whey in the same cans that are to be used to bring back the milk on the following morning. I know it is said, and truthfully said, that there is nothing to prevent cans being cleaned properly in which the whey has been carried. Our experience is that some do it; but there are others who neglect to do it. Some of the sour germs are left in the can, and these rapidly develop and generate a nasty and horrible flavor, which spoils the cheese. The safest and best way is to abolish altogether the carrying of whey in the cans. I think Mr. Millar has done his work well—very well; but he has not been able to do all that he should do. The factories have not all improved to that extent which those of us who are about them and have had to do with them feel is necessary. You say you have a good maker. I say the best maker we have to-day would be a better maker if he were to visit some other factory in his neighborhood, or if Mr. Millar or some other inspector were to visit him. He may in some slight detail have gone wrong and not be aware of it. He may have kept to himself until he does not really know the finest goods when he sees them. There is no way that I know of that is more likely to improve the quality than visits of this description. I hope the new directors will take up the scheme, and will divide the western district into sub-districts and secure a regular system of inspection.

These conventions are most important. They give us an enthusiasm that we otherwise possibly would not have—public attention is directed to the industry—but there never was a maker made at a convention. If there is one, I would like to see him. I never met him. Many years ago when I travelled around the factories to a larger extent than I am doing to-day, I found many factories off the track, but I never found one that did not receive me most cordially. I never found one that was not trying to make the best cheese But they had great difficulties to contend with. They had no control over the milk, and the patrons did not realize the importance of the most scrupulous cleanliness in connection with delivering it. I never saw such pitiful faces as the cheese-makers used to make when the cheese turned out bad, and I always found them willing to learn. There is a percentage of our goods in Western Ontario that is I think to-day as fine as any made, but I am sorry to say that there is more not so fine. We were the first in Western Ontario to start the system of inspection, which has spread all over the world, and now let us lend our aid to bring the system to perfection. I do not know of anything better, unless it were one or two large central schools, in connection with this inspection, where the makers could all go and learn from first-class men who thoroughly understand all the principles of cheese-making. These are the great points. We may come here and talk this and talk that, but unless it leads to an improvement in the quality of the article produced it will be useless. I thank you for the opportunity to make these few remarks in connection with Mr. Millar's report. I think Mr. Millar is a first-class man. He has done his duty well, and I hope we will be able to organize

these local boards or centres, or call them what you like. Perhaps it would be best in connection with our cheese fairs, and that he should superintend all these, and that we should have a staff of men visiting through the country in whom the cheese-makers have confidence, and who could be of assistance in instructing and directing them. We cannot improve the quality too much. Quality! Quality! Quality! If we are to retain our position, if dairying is to be profitable, everything that can reasonably be done must be done to improve the quality of the cheese turned out.

COMMITTEES.

The following committees were then appointed:

Resolutions: The President, HAROLD EAGLE, T. BALLANTYNE, ROBT. MCCROW and the Secretary.

Nominating Committee: J. A. JAMES, ROBT. JOHNSTON, R. ROBERTSON, R. M. BALLANTYNE and G. E. GOODHAND.

Utensils: T. B. MILLAR, J. F. WILLIAMS and J. A. RUDDICK.

THE DAIRY COW AND WHERE TO FIND HER.

Mr. JOHN GOULD, of Aurora Station, Ohio, was called upon and gave the following address: Every decade in dairy farming propounds the query "The dairy cow and where to find her?" and when, after long search, she is found, the drift of the march of events in our progress has carried us far in advance, and this cow does not fill the wants of the inquirer, and so it is the ever and over repeated inquiry: Where can I get a cow that makes me profit, and makes me rich? The inhabitants of this world are travelling a fast journey, and every force, element, and power in, and on the earth, and under the earth and in the air and space above the earth, are all put into requisition to propel us forward, and secure us a prize of some sort, designated by that one word "success," but the interpretation of it is as varied, as are the conceptions of its interpreters and seekers.

Each decade has had its answer, but the answer was only for the then, or now, and it has failed for the to-morrow. In this fast travelling world, the conditions change so rapidly that the solution of a problem only suffices for that one condition, and yet the problems are only changes rung upon the same old strings. We screw up the tension a little, we put more resin on the bow, we pull it with a little more skill, and its the same instrument; the tune may be, we say, wholly a new one, yet it is the same notes rearranged, played in faster time. The feet of the dancers go faster, and in the rush we say "We live in a fast age, how prosy it must have been twenty years ago!" And yet it is but a new combination of old forces, old energies directed in new channels, enlivened with steam and gas, and energized with currents of electricity, and more of nature's latent forces drafted into service, and tortured into fiercer activity.

In this march of progress we take upon ourselves much self-aggrandisement—nature's noblemen, and that sort of gilt-edged verbiage—but when we come to look the matter up, it is difficult to see in what way we have made and gained great advantage, except that the world has moved on and we have moved with it, and those who have not, are hid from sight. Every new invention, and every advance has been met with a new factor in competition; and each new advance has called out a yet fuller measure of intelligence to meet new activities, until to-day the battle of life is a battle of intellects, and the economics of farming to-day is a display of brain power, instead of an exhibition of force and brawn—sweat of the brow in fact, rather than sweat of the back, which in 1896 is shovelling sand, nothing more.

What is true of this hemisphere is comparatively true the world over. The farmers of the world are now all working along parallel lines, and in similar pursuits. It is now more than a local condition that confronts us, and to answer the problem of "This dairy cow and where to find her," answers it for all. This convention here to-day, in Wood-stock, is solving a problem for you, and indirectly solving it for the world as well. There is a universality of thought to-day as well as cheap freight rates, and no farmer on the globe has a positive advantage more than momentarily. This man is no longer in competition with his neighbor, but with everyone's neighbor, and to day it is into the common granary of the world that we put our products and we take out our share; and this whole question settles down at once to this proposition: can I produce a thing cheaper, make it better, and get it before the consumer quicker, than my neighbor, though this neighbor may live in the antipodes? The question I am to talk to is one of adjustment as well as of competition.

A shortage now affects us but little; there is an overplus somewhere that will average things. The great drouth of the past year made neither farm produce or dairy produce higher, and I am frank enough to say that I do not look very soon for the return of the old prices. Have you ever thought about this: That the farmers to-day are raising the same kinds of crops and animals, and marketing the same varieties of farm produce they were 2,000 years ago. The world has been canvassed for better kinds of crops, but still we raise the same grains, and roots and grasses, that were consid-ered best 300 or a 1,000 years ago. The world has been hunted over for animals, but has any change been made? Cows are still cows, and horses are the same, and sheep, hogs and oxen, yet constitute the list. All that can be said is that there are good, poor, and average live stock. We plow ground, raise the same crops that, so far as I know, Adam did—only wo employ different agencies in mechanism, feed the crops quick-acting phosphates to hasten their ripening, harvest them with lightning activity and ship them across a continent, before the man of fifty years ago could have gotten the rust off from his sickle and a new raw hide thong tied into his flail. The whole thing, you see, settles down into calculation, adaptation, and brain power. The latter must be supreme, as it is now the mastering of details, working from cause to effect, the better preparation to play our part, the playing of the same old tunes upon a more highly wrought machine, and our conceptions of the tunes intensified, and the notes so blended, that the old tune is fairly disguised, and we rise to a technique that moulds "Old Lang Syne," into a Wagner opera, and we call this success.

"The dairy cow and where to find her," is a case in point. Where have we found her in the past? and what was her similitude? It cannot be denied that, for the last two hundred years, even back as far as the literature of the dairy cow goes, she has been in a general way any different than now, but in specific ways she has undergone classifi-cation—that is, she has by selection and environment been so fashioned that she and her progeny have family resemblances, and peculiar qualities, so that in contradistinction to the cow of the back woods—the yellow, black, spotted and brindle beast of "slashing" and frontier—we have breeds of cows, or rather cattle, each with some distinguishing trait, peculiarity, or marking, and so are adapted in a greater or less degree to the wants of the dairyman. These cows, while of greater worth to the dairyman than a herd of "rustlers," are in flesh and blood still closely akin to the latter, for a cow wherever we find her is a mother beast, actuated by the same impulses of nature, governed by the same laws, pro-vided with the same means of nourishing her young, and differs in degree only from her thoroughbred, blue-blood sister in not being quite so artificially endowed in developed functions, less milk, possibly hardly so rich in solids, a shorter milking period, possibly not so perfect an assimilation of foods, and more likely to give her owner a brindle calf as increase. In contrast, her sister, whom we are striving to own, is, by having her every want supplied and her feeding and care practically taken out of the hands of nature, made more artificial, which is only another term to convey the information that this cow is more and more dependent upon the hand that feeds her and been removed from the struggle with nature—feast and famine, heat and cold, drouths and floods, pests of all kinds—the very combinations that have given us Cherokee cows, razor-back hogs, Bronco

horses and Digger Indians, nature's contributions to the common stock. In other words, the expert dairyman has by this artificial supplanting of nature's way of providing, been enabled to change the currents of this cow's life, and turn the current of life forces, hitherto used as life protection, and preservation, into channels of production, and by stimulation, and bringing in aids at every point to enlarge this cow's office of motherhood, has produced the cow that gives large messes of milk and for ten months, where nature's cow gives only a few quarts a day, and that hardly more than three months at best.

You will see by this that I am not over confident that this cow we need and seek will be found very far from home. certainly not out of our immediate locality, for where there is no guiding hand to control this getting away from nature, there will be little development; yet here I wish to say, that where high development has been reached in the dairy, to withdraw that guidance and artificial culture, and let these cattle drift back to what are actually natural conditions, is to throw away or abandon to helplessness; for in the past by feeding and pampering, this animal has become to be actually dependant, and to place her side by side with the brindle cow that has had many a hard wrestle with nature, and like an old campaigner of the war become an adept forager, makes her even more worthless, and she soon degenerates into a scrub of scrubs. And when at last the final transformation of this cow into a Bologna chrysalis, a thing in form of dairy produce will have been made, over which there will be no competition in the market, for a Bologna is the final "dead level," that links together an unprofitable past to a future which to thousands of careless dairymen will bring only the same old pangs of disappointment.

Where have we found this dairy cow in the past, and what did she look like? You will agree with me that we found her largely taking care of herself. It possibly may not be without the recollection of any man here before me to remember how that dairy cow of the past looked. We have all stood by her side many a time, and I do not wish to disclaim against that old cow to-day, because it was she that has given Canada and the United States their pioneer dairy wealth. How did that cow look? You remember she was spotted and she weighed anywhere from 700 to 1,400 pounds. She was black, she was white, she was spotted, she was every color, but green. I believe I never saw a green cow. I have seen green dairymen. (Laughter). She was all forms—dairy type, beef type, and several other types that have not been mentioned in the book. She was a razor-backed hog of the woods in one sense, and yet that cow had possibilities in her that the dairyman did not comprehend, and had he comprehended, she might have made a better cow and given us a dairy breed. If the men of the past had had the intelligence of the men of to-day, that cow of our meadows and pastures might have been developed into an animal equal to the thoroughbreds of to-day, and with a constitution that would have carried her through all those diseases which cost us millions of dollars on the other side, and which so often go into the pockets of the veterinaries. This cow had possibilities in her that might have been developed with better care. If she had been fed and treated as a thoroughbred, she would have come nearly being a thoroughbred. How did we care for her? She was turned out in the early spring upon the meadows and pastures to get her living, and she got it as best she could till fall, and then we dried her off, and she got the best living she could on stack hay, straw, and north wind. We sometimes tied her up in stables that were a little colder than outside, and we had to get a "crow" bar to pry her up in the morning. (Laughter.) What was the breeding of this cow? I said a moment ago that she was a thoroughbred of unknown breeding. What breeding did we get in succeeding generations? We wanted a cow that was big, and we asked of her all sorts of things, yet we did not give this cow a single opportunity to do any of them. We bred her as miscellaneously as we treated her. We wondered why the cows were of all shapes and all conformations. Not a sign of breeding for the best was admitted, and then we said that the fates were against us, and in March you remember we used to begin to sell cow hides for dairy produce. (Laughter.) This was like cutting off a supply that never was recouped. I unfortunately came away without my diagrams, and I am rather at a standstill to convey my exact meaning. I find my friend Theodore Louis has put up here a

capital illustration of what I want to say. Mr. Louis has put up his hog charts depicting a north-west hog—one that will answer for hog or bear, as the hunter may elect. (Great laughter.) One is a beef hog, I see, and the other is a hog of the dairy type. (Great laughter.) The farmer of the future must be a man who keeps a dairy cow, and the purpose of that cow must be to give milk, and not beef. The time has come when the man who is making beef from cows is not making very much money. I want to point out that whilst a man with a 1,000 pound steer is making a pound of actual human food, the man with the dairy cow is turning out four pounds of human food as milk, all digestable. Somebody is going to say that the steer will gain as fast in beef as the cow will give in milk solids. I assert in reply that a man who drinks a quart of milk has really eaten a pound of beef-steak, because there is no waste. A good cow in a year will give 700 pounds of solids—the same units of food nutrients that you will get from four steers weighing 1,000 pounds each. We want this cow to do this, and to do it she must be bred and fed for a specific purpose. If a man wants to make beef, all right. I wish a few of the dairymen would conclude that beef making is their especial forte, and let us have the dairy field. I want a dairy cow trained and bred to do a certain work. You will find men raising big cows so that when they get through with them they can sell them for *steer* beef. The fact that they have grown large is evidence that they have been putting food on their backs instead of in the milk. What we want is dairy type. What we want is a breed along certain specific lines, and let the butcher have the rest. What is the form of this dairy cow? I have an idea that we have got to bring in the question of individuality in the selection of our dairy cows. The average dairy cow in Ohio produced about 3,600 pounds of milk. Now a cow that only gives you 3,600 pounds of milk is a boarder upon you, and you are putting more food into that cow than you are getting money out of her. You see she is simply turning the feed of your farm into milk. It doesn't hurt to repeat old truths. In our rush to get something new we often forget old things that are better for us than the new things. The great trouble with some of us is that so many of the things that we know are not facts, and it does us good to go back to the Sermon on the Mount, and see whether we are Christians or not, or whether we are built up of dogmas, etc. I want to get back to emphasize some of these old truths. I said that speed and strength in a horse were different things, but that speed in a horse and milk in a cow are the same thing—products of nerve force. A thousand pounds should be the limit of her weight. I put the limit at a thousand pounds because I find that a thousand pound cow with good treatment will grow larger—perhaps one hundred pounds more. We must have a cow with a good udder. She may have a long pedigree, but she is of no value unless she has milk. She must also have a good bright eye. I put fifty of the one hundred points on the udder and the eye. I base my calculations upon these two points. Why do I say the eye? Have you ever met with a cow with a dull flat eye that was ever good for anything? She has no nerve power. She just simply eats, sleeps, and exists—that is all. What I want is a cow with nerve power, and nerve power and knowledge go with nerve development, and brain development is always indicated by a good bold eye. When I see the eye standing out prominently from the head and bright, then I know this cow has brain power, nerve power; and if she has got the udder so as to be able to make milk, then I can get it out of her by good care and treatment. Did you ever make a cow over? Didn't she die the same kind of a cow that she came into your dairy? Without udder development we shall not get money. I want the eye bright and prominent, and I want the forehead broad between the eyes, and a broad muzzle with two good nostrils in it. I want strong jaw power. She must have strong masticating power. I want my cow wide apart between the fore legs. My cow, to be a good milker, must have a large flow of blood, and to have a large flow of blood she must have large vital organs—heart and lungs. If I get a constricted form, legs near together, then I have no place in which to put these large vital organs. You want your cow wide between the fore legs so that she will have large vital action. I want an animal with a strong back bone. I dont want a cow that is tight built. I want wide spine spacing. I want a cow with wide hips. This cow is a mother, and she must have room for the office of motherhood, and that is one of the best signs I know of, that this cow has got the organs that adapt her to be a mother. I don't want this cow with

straight line underneath. I want her to carry a great big silo, and she doesn't do it unless she has got a large sagging underline. I don't want her to have barrel ribs at all. I want the ribs wide apart, and then she can take fifty pounds of ensilage into her stomach, or dry feed or grass in proportion. She will then have room to assimilate it into her system. I want my cow to give me reasonably rich milk. You can judge of this approximately by two or three external signs, such as by the secretions of the ear. If this is absent, your cow will be a skim milker almost invariably. Nothing is absolute, however, except guaranteed by test. We are driving very fast towards the days when every man who sells milk will be paid for it according to what it is worth in solids. It would be one of the greatest boons to the dairy industry of Canada to-day if all the dairy farmers would say, "Give us the test system, and we will take what our cows give, rather than ask our neighbor to share with us in what his dairy gives him." Then we would throw out the skim milk cows, and not hug them to our hearts as our dearest idols. I want to be emphatic about the quality of the milk, because it is going to be the criterion by which the farmer of the future is going to get his money out of the dairy—by the solids the cow gives rather than by the pounds of milk she gives. I never like to see a cow that is round and full right in front of the hip bones. Where you find her sunk in here, you are pretty sure to find a good cow. Now, where do you find this dairy cow of which I have been speaking? You will find her in all kinds of breeds and in all colors. I shall not to-day say anything about the breeds of cows. That is for you to select, governed by what your market is demanding of you, and you must answer for yourselves.

Having found this cow—I don't care what her breed is—how shall we breed her in order to maintain the quality that we want? First, we want to breed these cows on our own farms. If we buy from a neighbor he is as honest as we are, and not more so. (Laughter.) While he tells us he is selling us the best cow he ever had, we may find out within a week after we have completed the purchase that he was not telling the whole truth. A man who wishes to attain perfection to-day must breed his own cows. Let us take the best we have got, and let us decide upon some line of action. You say, "I have tried that and it failed." I know it failed. Why? Because you bred a new influence every year into that herd, and the end was that you had more breed influences than you had cow's influence when you got through. I don't want you to inbreed your dairy, but I do want you to breed them in line. I want you to select an animal as the head of your herd, and use that sire for two generations at least, and get seventy-five per cent. of the blood you want. Then go outside and bring in a strain of the same blood, and then by throwing out the culls every year, we shall be able to get an average of five, six and seven thousand pounds of milk from our cows. I believe we should do our breeding on these lines. Another thing: do not mix breeds; do not cross breeds. What are you going to do the next time? You have got to go back to either one breed or the other, and so you get back to the original breed again. If you like the Holstein, stay with the Holstein; if you have Jersey, stick to the Jersey. Stay by your breeding, stay by the breed, and do not make succotash of the whole business. The trouble with our cows to-day is, they are too well bred and a mix up of all breeds. We have too many breeds and influences, and our cows do not know what to do with the feed. Way back there is one influence wants to make beef, another skim milk, another butter-fat, another eats what is put before it, asking no questions, and you can look after the rest yourself, and the result is we have got these 3,000 pound cows. Who is responsible for it? It is not the cow. She is just as you make her. When a man begins to get better cows, and pick up his farm and make it better, he becomes a student, and he gets interested in those hidden things, and he begins to find out that this cow is a great mother, and that all success comes from catering to that ideal of motherhood, and when you get to that you will have a dairy.

FROM THE FARROWING PEN TO THE BLOCK.

Mr. THEODORE LOUIS, of Wisconsin, followed with a most interesting address on the breeding and rearing of swine, which was characterized by a practical thoroughness in the handling of the subject, which held the attention of the audience for an hour. Mr. Louis took for his subject, "From the Farrowing Pen to the Block." He said: I know full well that I have come to a place where we may look for farmers and dairymen of the highest order of intelligence. Your products and your live stock speak loudly of this. The young men who have graduated in your schools and on your farms are taking high positions in the United States, and bringing about the best results, so far as agriculture is concerned. Your able President made a very potent suggestion yesterday when he said that you could ill afford to let your intellectual young men that are engaged in your dairy business go to the United States and elsewhere for the want of salary. To approach the subject of swine husbandry before a dairy meeting always seems strange, and yet no dairyman will deny the fact, if he has learned the art of feeding, if he has learned to use all his by-product in a manner that will pay him, that the hog is a paying investment as an adjunct to the dairy. And how few there are who really understand the art of feeding. How few there are among the many that know how to feed the by-product of the dairy intelligently. How many there are who seem to have the idea that the more the hogs can put away, the more whey or milk the hogs can consume, the better. That seems to be the fault of a great many dairymen; they do not consider whether the hog can assimilate all it eats. But I am not going to take up the subject of feeding this morning. I think that shelter should be the first consideration. I have before me an audience of, say a thousand farmers. If I were to ask all those who have good shelter for their hogs to raise their hands, I fear that only forty per cent. of the thousand would raise their hands. There seems to be the idea that the hog does not need any shelter—that a hog is a hog, and that he is the scavenger of the farm. I am a stranger in your country, and I do not know what you do or do not have; but I daresay that as many hogs in this Province sleep in straw piles as in the States. I daresay that as many hogs have simply a roof over them and a wire fence or a rail fence at the sides for the wind to blow through. The man who leaves his hogs without shelter, and lets them sleep in a straw pile, is the man who is constantly asking the questions, "Why do my hogs get lame?" "Why do they cough?" "What ails my hogs?" If you were the editor of an agricultural paper, you would find your desk strewn with just such questions as these. Have you ever thought—you, who let your hogs sleep in a straw pile—why they cough, when you look at them sleeping all huddled together, becoming in a heated condition, and sweating through the pile heat from below, and a cold, chilly air striking them from above? Have you ever considered why they cough? Or, if you sleep them upon floors simply sheltered where the bedding is, the bedding never being removed perhaps for months, and more constantly being added until it becomes dusty, and every time your hogs disturb the nest the dust rises, have you ever wondered what ails your hogs when they cough? I could name a hundred different conditions that are held before the hog as resting places that are most detrimental to his life and to the future offspring. When once a disease, especially those of lung origin, is created within our breeding hog, let me say it will be handed down for generations to come. What kind of shelter should we have for our hogs? From the early days, although I had but few dollars or conveniences to meet my wants, I made a close study of the conditions which would be best for the hog. You consider very closely what will be best for your cows. You study out what stables and stalls will give your cows most comfort. Did you ever consider that comfort is required for any animal that is a flesh-producing animal, and that comfort means the same to the hog precisely as it does to any other animal? When I first went into Minnesota in connection with the institute work, I found that the farmers had admirable stables for their horses and splendid barns for their cows, but there were no hogs, and when the hogs came to hand there was no shelter for them. Yet these men burned thousands of tons of straw every year upon

their farms. I advised them to press their straw into bales, lay a foundation of stone, then put the straw bales upon it brick fashion (a ton of straw would lay a wall eighteen feet long and six feet high), lay boards across the top, and cover them with clay mortar. This, I guaranteed, would make a warm shelter for the hogs, even if the temperature were down to forty degrees below zero. Many of them followed my advice, and I am gratified to say they are doing well.

On my own place I have always found a 7x8 house—a shanty-like house—will give better satisfaction for the feeding of and shelter for breeding animals than anything else. A pen 7x8 in dimensions will sleep comfortably four hogs or five in winter. They can lay one along side of the other and not become heated. It will make a comfortable breeding pen if there is a fender inside of it. I used to lay scantling right on the ground (2x4), set a corner post up at each corner, then board it round about and put on a shanty-like roof. I want it seven feet high in front and five feet at the rear. I want the door cut at least four feet high and hung on leather hinges. I am not talking here simply to the man who is financially able to do things. It has been customary for me to feel that I speak to all classes of farmers when I come before a convention or an institute audience. I feel that I come before a class of men who are not all financially able to do things, and it is often a leader in that direction that is very valuable to them. I want a door say four feet high, so that I can get into the stable at the time of breeding, when probably my assistance is needed at farrowing time. Sometimes a man takes me out to his farm to see his hogs. He shows me them. He says, "If you will get right down on your hands you will see my sow." I don't want to be kneeling down when I want to see a sow. It is astonishing what conditions we do find. In Minnesota I once went up to the farm of a Scotchman. He had a fine daughter, like most Scotchmen have, and he says to her: "Lassie, go and let out the hogs" And the lassie went into a hole in the straw pile and out came the hogs. Well, he had stately barns and stately stables for his horses and his cows. Hog houses, and especially on a dairy farm, should be erected with a view to elevation where there will be a natural drainage. I do not approve in my section of the country, where our temperature falls to thirty degrees below zero, and where our winter snows are heavy, of a double hog pen with an alley in the centre through. One side of a hog house so built must naturally face either the west or the north, and as our prevailing winds are from the west or the north during the winter, it always gives the hog house a cold condition. In the spring of the year, when we have a double hog house with a double roof, when the snow melts the yards in front of the hog house are always muddy. On the north side of the hog house they are not thawed out until the first of May. This is one of the reasons why I say we should have a house on lofty ground so that the yards may be kept clean and dry. For convenience, as an illustration, I have brought my charts along. (Mr. Louis here unfolded a large chart showing the plan and superstructure of his hog house, which he said was 100 feet long, with an addition of a feed and cook house, and proceeded to explain its advantages). The alleys were, he said, five feet wide, and there was a fender, raised eight inches from the floor, in each stall. He pointed out the desirability of having secure fenders to prevent the sows from overlying their young, and asserted that a man could ill afford to be without a fender. The gates were 2x3, and had a rope and pulley attachment to facilitate the opening. When they wanted to feed the hogs they allowed just as many into the feeding pen as they had enough room for. He urged the importance of having sufficient trough room, and remarked that he had been surprised to go on to farms and find ten hogs expected to eat out of a trough a foot deep and four or five feet long. The result was that the stouter pigs got the lion's share and the little fellows none at all. In each partition between the stables in his hog house there were doors that rose upwards so that the hog could be easily transferred from one to the other. He showed the desirability of having easy access to the stalls. They should never have to climb over a partition to get into the hog pen. The man who had to do that was not very apt to clean the pen out. He remarked that men cleaned out the stables of their cows and horses twice every day, but their hog pens were rarely touched. The manure was often allowed to accumulate, and some people held the opinion that it was healthy for a hog to live under such conditions. This he emphatically denied. The

yards in front of his hog house were the same width as the stalls, and twenty feet long. There was a window over each stall. When he was building his hog house people had laughed at him for putting in windows. It seemed in the eyes of some people that whatever you did for your hogs you were doing too much, and whenever you said you were going to favor your hogs you fell just so much in the eyes of your neighbor. There seemed to be the old Mosaic law hanging still around the hog—"Thou shalt not eat thereof"—and yet we little knew what profit it was to us. His hog house was twelve feet high in front, and right above it was a chamber for the storing of hay and straw. There was a ventilator over each pen through which they could drop the bedding into the stables. A pig when breeding should have fresh bedding every morning, and when a man had to go to a straw pile to get it the pig often had to do without this desirable comfort. He had a pair of scales on the floor at the further end of the alley, with a fence around. A pair of scales and a pencil was a better educator to the feeder than he (the speaker) would be if he were to talk to them all day. When he gave a pair of scales and a pencil to his son upon the farm he became an intelligent feeder. Every feeder of swine should know how many pounds of live weight he was making out of a given quantity of feed. When they let the hogs step onto the scales once every twenty-four hours they knew precisely what they were doing. You may say to me that you have plenty of by-product, and that you hardly know how to get away with your by-product. Have you ever thought that a hundred pound pig, or a pig weighing between 70 and 100 pounds, cannot, during twenty-four hours, eat and assimilate and give you the best returns on more than twelve pounds of milk? And yet you are, in all probability, feeding sixteen pounds of milk a day to every one of your pigs when you could have made on the same feed the same amount of live weight gain on two hogs as you have done on one. The dairymen often make a mistake by feeding their milk without grain. They say, "I have the milk, I am bound to feed it, and my hogs must get away with it." Have you ever thought that you have simply the one kind of food—a nitrogenous food? If you add to each 100 pounds of milk thirty pounds of corn meal or of barley meal, or barley and rye mixed, you will find that you are making two pounds of live weight where you made one before on your skim milk alone. You will find that you can raise two hogs in the place of one. The competition in the breeding and feeding of swine is becoming greater and greater every year, and it is only by economical feeding that we can possibly hold our own. It is customary upon some dairy farms, where there are not enough pigs to consume all the by-product, to store the milk in barrels. I cannot think of anything—although I am a German and they say all Germans like sauer kraut, and I do—I cannot think of anything more detrimental in the feeding question and to the lives of our hogs than the storing of milk in barrels. Think of the swill barrel that stands at the back door in which are put the washings of the creamery, and the milk, and the house offal, until everything becomes mixed up in the barrel, so that when the man comes to feed his hogs he holds his nose with one hand and the pail with the other. And then that man complains that his hogs are not doing well! He forgets that when milk becomes acidulated in a barrel it is losing the four per cent. of sugar that the skim milk contains. It has turned into alcohol or vinegar. I do not know why some men persist in constantly feeding the sour stuff, and aiming to get it sour for their hogs. There seems to be an opinion that it is necessary to have the food sour in order to get the hogs to eat it. Let us judge the hogs by ourselves. We want a pickle sometimes, but we could not take them all the time without anything else. I believe that under a system of high feeding, when we are fattening the animal in its last stages, that it may be a good thing to give it a slightly acid food, but when food has turned to vinegar or alcohol we certainly should not feed it any more.

Now, as to the feeding of brood sows. How are they fed? Is there any consideration on the general farm in feeding brood sows? Are they not fed precisely like the rest of the hogs? You are probably not corn feeders like we are in our section, but possibly you feed barley and rye. I do not know what feed material you are using, but how many men are there that ever take into consideration that the pregnant sow should receive this consideration in feeding: that she should be fed on the feed that is of use to the digestion? Instead of this there are men who simply feed the brood sow at the same

time as the others, and get them into a fatty condition like the ordinary hogs, and then complain of the failure of their sows to breed. It is hard to imagine all the mistakes that are made in the feeding of our swine. If four pounds and a half of feed will give us one pound of live weight to a 100 pound pig, fed on three rations a day, there are men who are simply feeding to sustain life. The pig should grow from the time it is born until it goes to the block, and every moment the pig stands still—I care not if it is a pig that the dairyman keeps simply for the consumption of his by-product, or if it is the hog the farmer keeps for profit—it is money out of pocket to the owner. During the winter the hog requires nearly two pounds and a half of feed in order to sustain life, and we have to add the other two pounds in order to make one pound of live weight again. It must also be remembered that you have to feed against temperature, and it is here that the advantages of a good house come in. I find from conversation that you have small yards, that you feed your hogs in pens, and have simply a small yard for them. Gentlemen, I have found that exercise means money. I have found that when feeding high it is an advantage to give hogs plenty of room; they do better. Under the highest system of feeding, and especially you dairymen that are feeding so much sour stuff, you will often find that the hogs are everlastingly rooting and throwing up your yards regardless of everything. You will probably attribute it to the breed. It is nothing of the sort. Under high feeding the hog must be stimulated in its digestion. He roots not out of mischief but for those things he finds in the soil that will aid him in digestion, and that will take the sour elements out of his system. Have you ever thought that you are dealing with an animal with the smallest stomach with the exception of a horse? Have you ever thought that digestion in the hog goes onwards into the intestines and assimilation at the same time? Have you ever thought that when you put more food into the animal than he can eat clean at one time, that you are simply feeding to a disadvantage? A hog, under a high system of feeding, should have a condiment. It is my practice to give my hogs charcoal. I presume I am in a timber country where you have lots of charcoal. It is not so with us. We have got to pay high prices for our charcoal, and therefore we take our corn cobs and burn them into charcoal. I do it in this way. I dig a hole in the ground four feet deep, a foot in diameter at the bottom, and about four feet at the top. I set a fire in this and by degrees add the corn cobs, first about a bushel and then three or four bushels more. When one side of the cobs have been burned I turn them over, and I continue to add until the hole is full of glowing cobs. Then I shut it up with earth, and in the morning I can take out ten or twelve bushels of charcoal. This charcoal is just the thing to aid the pig's digestion Take six bushels of charcoal and break it up into the size of a hazel nut (it won't matter if half of it is dust), and add to this six pounds of salt and a bushel of wheat shorts. Put it on the floor and mix it well with a shovel. Then dissolve a pound and a quarter of copperas in a large pail of water, and by means of a sprinkler sprinkle it over the charcoal mixture. Then mix thoroughly and put in a box. Stand this in your yard and fix securely with stakes. You will be astonished what an amount of this mixture the pigs will consume, and you will also be surprised to find how it will assist their assimilation and digestion. If I should take the floor again you would do me a great favor if you would ask me questions in any direction in which you may wish information, or where you may think I am in error. I have had an experience of feeding swine extending over nearly thirty years, and by your questions I shall be enabled to add to the instructiveness of my lecture.

The meeting then adjourned until the afternoon.

SECOND DAY—AFTERNOON SESSION.

When the Association re-assembled in the afternoon, JAMES A. GRAY, of Atwood, read the following paper:

CARE OF MILK FOR CHEESE-MAKING AND CARE OF SAMPLES FOR BABCOCK TEST.

This a subject that is of great importance in connection with cheese-making, and one that the producers of milk for cheese factories should be interested in. If cheese-makers do not get milk in good order it is a very difficult matter for them to produce an A1 article.

Bad flavored milk is far-reaching in its effects, for if a cheese-maker is skilful enough to handle such milk, and make it into cheese that will pass the inspection of the buyer before it is shipped, before that cheese comes into consumption the bad flavor will no doubt have developed, and then the reputation of the factory is injured thereby.

The most important matter in connection with the care of milk is absolute cleanliness from beginning to end. Everything that milk comes in contact with should be clean. When the cows are milked in the stable, the milk should not be allowed to stand there any length of time. After the cows are milked the milk should at once be removed and strained, and then properly aerated by means of an aerator, or by dipping, stirring, or pouring so as to expose it to the air. I am of the opinion that the best way to aerate milk would be to pump air into it with some kind of a force pump. I have not seen this done, but I am informed that it is done to a large extent in the United States. Of course if this were done the air would require to be pure. Perhaps there are some in the audience who have been in the habit of doing this, or have seen it done. If so, I hope they will speak out and inform us what the results have been.

If milk has been properly aired and stirred it is not necessary to put the can in cold water over night, but it should be placed in a position so that the air can get around it. Where milk is kept from Saturday night till Monday morning I think it is necessary to put it in cold water, but it should never be put in the water until the milk is thoroughly aerated. Some of our best patrons have told me that they found it impossible to keep it during the hot weather without doing this. I know some will not agree with me on this point. Now, the morning's milk should be aerated and stirred as well as the night's, for I am of the opinion that a great many of our tainted and gassy curds come from the morning's milk. People, as a rule, just strain it into the can, put on the cover, and take it to the milk-stand. When a patron is sending two or more cans to the factory he should not mix the night's and morning's milk together. They should be put in separate cans and the cover left off the morning's milk until the milk hauler comes along, so as to allow the animal heat to pass away as much as possible. I would far rather have five or six cans of changed milk (I do not mean thick milk) than one can of tainted milk.

It should be the aim of every milk producer to send his milk to the factory in the very best possible condition. While there are a great many farmers who take a pride in doing this, still there are others who persist in allowing their cows to drink dirty stagnant water during the hot months of summer, and in the fall stuff their cows with turnips and turnip-tops, and expect their cheese-makers to make a first-class article which will bring the top price on the market, while I admit that turnip flavor can be taken off so that the buyer may not be able to detect it when the cheese are shipped; yet I have my doubts that the turnip flavor will develop afterwards, and if so it will have a bad effect on our fall cheese. If farmers were more particular in salting their cows they would find that during the hot months of summer they would have less trouble in keeping their milk in good condition.

Another defect in the care of milk is the returning of whey in cans. If the whey is not emptied when the cans are returned, and the cans thoroughly washed and scalded, it is almost impossible to have fine flavored milk.

With regard to care of samples for the Babcock test, I would say that this is also a subject of vital importance, for if a cheese-maker is careless about this matter it is impossible for everything to come out all right. The jars to receive the samples should be placed on a shelf or table convenient to the weigh-can, each route by itself, and each properly labelled. The bichromate of potash should then be put in the jars before any milk is put in. When the testing is done once in two weeks, about one-quarter of a teaspoonful of bichromate of potash is required to keep the milk in a liquid state, and when tested once a month one-half a teaspoonful is required. There are several methods of taking samples. Ours has always been done in the following manner:

After the milk has been poured into the weighing-can, and thoroughly stirred, a sample of milk is taken out with a one ounce dipper and put into its respective jar. This sample is taken out every morning. The jars are well shaken every morning when a fresh sample is put in so that the cream will not adhere to the sides of the jars. Before proceeding to test the milk at the end of two weeks or a month, as the case may be, the jars with the milk should be placed in a tub of warm water, so as to raise the temperature of the milk to eighty or ninety degrees. By doing this any cream that may be sticking to the inside of the jars will be removed, and you will be enabled to get a more correct sample. The milk should then be thoroughly shaken, and then poured into another jar, then back into the one it formerly was in, and then the sample should be taken with the pipette and placed in the test bottle.

The milk should never be emptied out of the jars until the test is made, for quite often a bottle is broken during a test, or some other accident may occur, and if the milk is emptied there is no way of getting another sample, and then justice cannot be done to that patron. Where the system is adopted of paying by the per cent of fat, it is of the utmost importance that great care should be taken not only with the samples but also with the testing. No person should be allowed to do the testing who does not thoroughly understand it. I am not at all surprised that some factories which tried the new system for one year went back again to the old system. I know of one factory that did this, and the reasons for going back to the old system were the carelessness of the cheese-maker in taking the samples, and allowing his inexperienced helpers to do the testing.

FRATERNAL GREETINGS.

The PRESIDENT then read a resolution passed by the Directors of the Association after the adjournment. It was as follows: "That the following telegram be sent to the President of the Eastern Dairymen's Association in convention assembled: 'The Dairymen of Western Ontario send greetings and wish your convention as great success as their own.'" The resolution was adopted amid applause.

The PRESIDENT: As this is a makers' meeting I would like to introduce an innovation. The Vice-President of this Association is a successful maker and knows all about cheese-making and what makers ought to be, and I would like to ask him during the next couple of hours to preside at this meeting. I have now great pleasure in asking Vice President McLaren to preside.

Mr. MCLAREN was loudly applauded on taking the chair. He immediately called upon Mr. HARRY WHITE, of Belfast, to deal with the following subject:

GASSY MILK AND FLOATING CURDS.

As I was one of your committee appointed at our last convention to prepare a paper along the line of cheese-making for this meeting, I will speak for a short time on the handling of gassy milk and floating curds. In the first place I will just say that I know of no better way of handling gassy milk or tainted milk than to return it to the farm from whence it came or let it run to the whey tank.

I think that most of the cheese-makers will agree with me that we do sometimes get milk in which we do not detect any bad flavor when delivered to the weigh can, and often not until heated to about the proper temperature for setting. This is the time, I believe, the maker should be very careful, and examine the milk to ascertain its condition before setting, and should he detect any taint or gassy flavor he should have such milk ripened quite a good deal more. If I were setting milk with a clean flavor to come in eighteen seconds with the rennet test, I would prefer milk with a bad flavor to be ripened down to twelve seconds. I would recommend using one ounce more of rennet for this kind of milk. My reason for so doing is that I think I retain more moisture, which is a help to a floating curd. I would like the curd from gassy milk to be quite firm before cutting, and to be cut quite coarse and worked very slowly and carefully, and to be left as much as possible in the same form as when first cut and not to be heated above ninety-six degrees, and to have one full hour in cooking. My reason for not heating above ninety-six degrees is that I want to hold more moisture, and by so doing I am accomplishing that object. If it should turn out to be a floating curd I do not want the whey drawn off until I have three-eights inch acid with hot iron test. Then I dip in one end of sink. I do not stir a floating curd any at the time of dipping, but let it mat as soon as possible for milling. The Harris mill is my favourite mill, for which I have two sets of knives: one cutting five-eighths inch square, the other one-quarter by seven-eighths. This is the one I use for gassy and floating curds. Now, as soon as the curd is matted enough I put it through the mill. I have several reasons for so doing. One is, I want to get rid of some of the whey, which would have passed out at the time of dipping had I stirred it, and the second is, that I get a good many of the holes that are in the curd cut open and exposed to the air. After milling I do not stir any, but let it mat together again. Then I break over in quite large pieces and turn at short intervals until I have one and one-half inch acid with the hot iron test. Then it should be milled a second time, when it should be kept apart until ripened down ready for salting. I would recommend the temperature of the curd to be kept up to ninety degrees until the curd begins to have that nice silk feeling. Then let the curd cool down as the time approaches for salting.

I like cheese from a floating curd to cure out slowly, and to do this I want the curd to go to press at about 70 degrees, and use half a pound less salt than I would on a curd with a clean flavor. By using less salt and going to press at a low temperature, cheese will cure out slowly, and when cured will cut up much nicer than if more salt was used, and had gone to press say at eighty degrees. Press all cheese forty-five minutes before bandaging. Use plenty of clean scalding water when bandaging. Use two sets of cap-cloths when pressing, and press all cheese twenty hours before taking to the curing room.

In conclusion my advice to makers is: Do not undertake to make cheese from tainted or gassy milk if you can avoid it. I think if makers would do more missionary work among their patrons, and ask for better quality of milk, and let some other fellow look after the quantity, they would have less gas and better cheese.

Mr. BLAYNEY: What is the cause of gassy milk?

Mr. WHITE: I cannot give you the causes, but I can give you some of the reasons. Cows out of condition; neglect after the milk is milked; cows drinking bad water; cows eating bad weeds, etc.

A MEMBER: At what temperature would you have the water?

Mr. WHITE: Along about ninety-four degrees, ninety-five degrees, ninety-six degrees. I do not think two or three degrees makes much difference, but I would not want to go over 100 degrees.

A MEMBER: Do you think there is anything gained by turning the cheese in the press in the morning?

Mr. WHITE: Yes. To prove this I took six cheese; I turned three of them in the morning and the other three I didn't. They were all treated alike up to going to press. When these cheese were seven weeks old I cut them through, and I found those that had been turned were a good deal better cheese.

A MEMBER: What condition should the milk be in to make a perfect cheese?

Mr. WHITE: I would want milk about twelve hours old, sweet and clean in flavor, and then I think, if the maker will use the right skill, he will have a perfect cheese.

A MEMBER: Why would you recommend less salt with a gassy curd?

Mr. WHITE: There is generally a dry curd and if you use as much salt you get a dry hard cheese, but using less salt you will get a cheese that will cut up better.

A MEMBER: How are you going to get your curd down to seventy degrees in the hot weather?

Mr. WHITE: Well, get it there if you can; if you cannot, then do the next best thing.

Mr. GRAY: I cannot see how Mr. White can get his curds down to seventy degrees in the hot weather. Of course I believe it is a good idea, but I can't see how he can get them down to that.

Mr. WHITE: My experience is that when I get floating curds it is in cool weather—almost frost, sometimes. That is the time when we get floating curds; but I have not had any for some time. In the really hot weather you do not get many floating curds, but you get fast workers.

A MEMBER: What temperature would you recommend the milk to be tested in?

Mr. GRAY: Supposing you had put your jars into water about eighty degrees or say one hundred degrees, it would hardly raise the milk in the jars to that temperature. I should think about seventy degrees or seventy-five degrees would be about the proper temperature at which to test the milk.

A MEMEBER: Would you recommend the acid to be of the same temperature as the milk?

Mr. GRAY: I just use the same temperature.

A MEMBER: I tried it at a test this fall. I warmed the milk to a temperature of sixty degrees, and I put in the acid cold, and I found it took more acid to make the test than when it was warmed to the even temperature of the milk.

Mr. GRAY: I have not tried it. I am glad that you have mentioned that. I hope the cheese-makers to-day will make good use of their time, and that anybody who has experiences like that will let us know.

Mr. PAYNE: That is precisely my experience with the acid. To have uniform results you want to have uniform temperatures.

Mr. TYNDALL: I would like to ask Mr. White why we have gassy curds on cold nights?

Mr. WHITE: It is simply this—the farmers think the milk is going to take care of itself those nights. (Applause.)

Mr. TYNDALL: That is what I have always thought myself, and I mentioned it in order that the farmers here would be reminded of it.

Mr. TYNDALL: Mr. Gray spoke of the whey going home in the cans to the patrons again. Can he not give any reason why it is that these factories turn out quite as good, and in a great many cases, better cheese, than those where the whey is fed at the factories? Some of the factories whose whey goes home in the cans are great prize winners.

Mr. GRAY: I must admit that there are factories standing high where the whey goes home in the cans, but in those cases the patrons empty out the whey from the cans just as soon as it gets home. I admit that good cheese can be made where the whey is returned in the cans if the cans are emptied shortly after they are taken home; but how often you find the cans left on the stand until some time in the evening. After standing for a long time they are washed out and then the milk is put into them. I cannot see how good milk can possibly be had under such conditions.

Mr. TYNDALL: Which do you think would do the most harm, letting the cans stand with a small quantity of milk in them or with whey in them?

Mr. GRAY: The whey by all means.

Mr. TYNDALL: In some cases I agree with you, but in others I do not. In some cases where the whey is not carried the cans get only a temporary washing out before the milk is put into them; whereas if the whey is left in, the acid eats out all the grease. Where the whey is returned in the cans the patron is more careful; he is afraid of that whey injuring the milk the next day, and he cleans it. On the other hand he does not suspect that a little drop of milk is going to do harm. As a rule it does more harm. The only way to make a good cheese at the factories where the whey is fed is to have the hog pen at least a mile from the factory, (laughter), and then you would have to make arrangements with the clerk of the weather never to let the wind blow towards the factory, because bad odors will go into the curd. There are some factories where they are careful to wash the cans before they leave the factory. That is all right, but if a little milk is allowed to go home in the cans it is going to do a great deal more injury than the whey going home in the cans. I also think the patrons should have what profit there is attached to the whey. There is no harm if they are careful.

Mr. PAYNE: I think a great deal of the difficulty would be obviated if our friend were just as much afraid of the whey as he is of the pigs, and consequently would get the milk away from the whey.

A MEMBER: I have made cheese under both circumstances, and the dirtiest cans that I have ever seen occurred where the whey was not taken back.

Mr. WHITE: Do I understand Mr. Tyndall to advocate returning the whey in the cans?

Mr. TYNDALL: In certain cases I do.

Inspector MILLAR was then asked by the chairman to say a few words on the subject. He said: This is a vexed question, but I must say that I am decidedly in favor of having the whey fed at the factories. I have been travelling amongst the factories for some years, and have had opportunities of judging between the two systems. I have found that in nine cases out of ten the cheese made in factories where the whey is fed is of a better flavor. This being the case, it shows clearly that the better plan would be to leave the whey at the factory. If I were a patron of a factory I would rather see the whey running down the creek than see it returned in the cans. I am satisfied that if we abolished this whey nuisance we would have more money for our cheese at the end of the year. The danger of returning the whey is this: While one hundred patrons may be very careful and see that their cans are kept clean, there may be one or two in the lot who are careless, and these two patrons will spoil the flavor of all the milk sent to the factory. I do not think there is a factory in the country that has not one or two careless patrons in it, and sometimes more, never less; and, this being the case, I think you will see clearly that it would pay well to have the whey left at the factories. With regard to the hog pens, I could refer you to a number of places where the hog pens are not ten rods from the factory, and yet it would be impossible for you to tell that a hog pen was about the place unless you saw it. If they are kept properly it is not necessary to have the hog pens at a distance.

Mr. RUDDICK: This whey question is a difficult one. It occupies more of the attention in this section than it does down in the east. I agree with several speakers who have just spoken on the point that the matter of cleanliness has a great deal to do with it. I would begin in this matter of cleanliness right at the factory, and see that the whey tanks are thoroughly clean. There is a great deal of fault to be found upon that point. Some of the whey tanks are never cleaned, and they should be. Down in Quebec they are a good deal ahead of you in matters of that kind. They are adopting the plan of tin-lined whey tanks, and they are thoroughly cleaned and scalded every day. They do not get dirty whey in that case. Whey is not dirty unless it is polluted, and thus they get over a good deal of trouble. I find that in some sections the patrons will

not listen to the idea of having the whey fed at the factories. Then let there be every possible attention paid to the whey tank It would pay the patrons of any factory to have the tank so made as to be thoroughly cleaned regularly, and you cannot have them too wide. Galvanized iron lining would be no good, because it would be eaten off very quickly by the acid in the whey. There is another point The very sour whey has the effect of taking the tinning off cans quickly. Cans in which sour whey is allowed to stand will not last as long as cans that are emptied out as soon as the whey is returned, and if the tin is worn off the can it is not a fit thing to carry milk in. If you will watch that sort of thing you will find that the flavor of the milk in cans of that kind is always bad.

A MEMBER: What sort of a whey tank would you prefer?

Mr. RUDDICK: Tin.

A MEMBER: How long would that last?

Mr. RUDDICK: For years.

A MEMBER: Have you ever known any to be built of concrete?

M. RUDDICK: No, I have not heard of them. That would necessarily be a tank in the ground.

A MEMBER: I have been thinking of putting in a concrete tank.

Mr. RUDDICK: I would be afraid that the acid in the whey would have the same effect on the cement as the acid in a silo has on the cement lining.

A MEMBER: I wrote to a dealer in cement asking his opinion about it. He said that the whey would not have any effect upon it at all. I am quite willing for him to put one in for me if he will guarantee that it would not.

Mr. RUDDICK. There is this objection, it would necessarily be in the ground. I think we should have all our whey tanks elevated; they are so much easier to clean.

Mr. BELL: I put in a cement bottom to my tank. It lasted two weeks; the whey seemed to eat a hole through it in no time.

A MEMBER: There are a good many buyers present; I would like to hear from some of them on this whey question.

Mr. BALLANTYNE: To my mind there is only one view of it. I have possibly had as much opportunity as most people to judge of the effects of the whey carried in the cans, and I do not think there can be two opinions about the evils of the system. I was surprised to hear the last speaker say that the farmers wanted it. Satisfy the farmers there is no benefit, and I will warrant that they will not want it. There is no benefit, and if they want to get the highest prices for their cheese they must discontinue it at all hazards. Do you pretend to tell me that by hauling back fifty or two hundred pounds of whey you can consume that whey more economically than if it were fed in the factory? I will defy you to find cheese factories as a rule where they do it, that the cheese have not these defects. Which are the factories that fetch the highest prices? Does Bluevale send back its whey? or Elma, or Strathallan, or Bright? And these are the cheese that will sell where others can't sell. I do not pretend to say that they get the premium they should get, and might get, because they are really paying for the inferior goods; but there are no two opinions about the evils of the whey system. It admits of no discussion, to my mind. Talking about the Old Country, they have nothing of the kind there. I cannot emphasize the disadvantages of this vicious system too strongly. Mr. Ruddick admits that cans with the tin worn off are not fit things to carry milk in. How long will it be before they are in that condition if they are used for carrying sour whey? I repeat what I have previously said, how many of you, if you were living, say in Woodstock, would take milk from a dealer for house purposes if you knew that that dealer used for carrying sour whey the cans from which he draws your milk? If cleanliness is important in connection with milk for domestic use it is equally as important for cheese-making. You must remember this—you can't realize it too soon—the public are getting more fastidious every day and every season. They will not take inferior goods of any

description. I remember the time—and it is not so long ago—when cheese was made and considered fine that would not be eaten to-day. We have other nations competing against us to-day that we had not then, and they are catching up to us—going ahead faster than we are. There are other articles of food—Australian butter and mutton, American beef, jams and marmalades—that are used now in the place of cheese to a certain extent. There is only one way in which you can retain your reputation in my opinion. You must do everything to improve the quality of your cheese, and the first thing to do is to do away with carrying back the whey. You may tell me that some of the factories where the whey is hauled sell as well as others. That is because the markets fluctuate—one sells to-day, another to-morrow. But do we find, as a rule, these factories selling as well? We do not. Dealers who want to fill an order will perhaps buy them, but not as a general thing. I know from my own experience and observation that you hardly ever get a cheese made at one of these factories that when it gets aged does not show defects. We have to make fine goods for another reason. The time was when Western Ontario cheese was quoted a cent and a half above Belleville and Brockville and those other districts. Is it that to-day? There may be other reasons to account for the change, but our goods are not improving at the rate they were then. Now that difference comes out of the farmer. The cost of hauling the goods and manufacturing and all the other departments of the business is the same whether the cheese fetches a high price or a low price. Remember, this business will not continue to be profitable unless you improve the quality. The first thing is perfect milk. We now have a class of makers who cannot be beaten in the world, striving by every means to do their best. We now have better buildings and better machinery, and curing-rooms and working-rooms and press-rooms, such as we never had before. The buildings are not now barns, and the temperature can be kept even. I do hope that we will go on and do everything that we can to improve the quality, and the first thing to do is to get pure milk.

Mr. HOULDSWORTH expressed the opinion that there was very little value in the whey as feed when it got back to the farmers the next day.

Mr. BUTCHERT: I notice that the buyers buy the cheese and keep them in cold storage, and they accumulate there. It seems to me that has something to do with keeping the price down. I would like to ask Mr. Ballantyne whether, if he were a patron, he would approve of this method?

Mr. BALLANTYNE replied that it was purely a commercial question, and it was impossible to give an answer that would apply in all cases. He thought it helped to regulate the price. He would not attempt to say what would have become of the cheese trade last year if cold storage had not been resorted to. There was enough cheese in May last to supply the demand for months. It was a question whether the manufacture of summer cheese was not in excess of the consumption. They had to be kept somewhere or go at a low price. The market would have been more demoralised, the losses would have been greater. There would have been less temptation to speculate unless there had been cold storage in which to put these cheese. The losses in England last year were simply enormous, and the result had been that there was very little speculation on the part of the English importers. The speculators had been more on this side than formerly, and they had helped to steady the market, and he dared say, to improve the prices.

PRACTICAL CHEESE-MAKING.

Mr. A. T. BELL, of Tavistock, then read the following paper on "Practical Cheese-making":

In dealing with the subject of practical cheese-making, it must not be expected that even the bulk of this paper will contain new material for cheese-makers Of necessity there must be a good deal of repetition, for the art of cheese-making with all modern improvements has been taught for years, and I cannot think of a satisfactory excuse,

any cheese-maker may have had for not acquiring that knowledge which is necessary in order to manufacture first-class cheese. However, cheese buyers and instructors tell me that, from what they are able to learn travelling around among the factories, there is just as much need as ever there was of preaching the gospel of cheese-making. Taking for granted that this is a fact I will try and make plain the chief points in practical cheese-making so that he who runs may read. We will commence when the milk has been received at the factory, although the ultimate result is to a great extent determined long before this stage is arrived at, for all cheese-makers will agree with me that the condition of cows, cleanliness in milking, care of utensils and proper care of milk, are simply indispensable in the production of milk required to make *first-class cheese*, for nine-tenths of all the trouble experienced is from the effect of milk not being properly cared for in some way or another. We want a revolution in this respect, and until we have it we can never hope to reach that goal of perfection which should be the ambition of every cheese-maker. When the milk is being received, it is well to start heating it when the vat is partially full, unless the cheese-maker is suspicious of any over ripe milk being delivered. In this case, postpone the heating until a rennet test has been made. Take the required amount of milk from the vat and heat it to 86°, and, to insure that this work is done properly, I would advise the purchase of two small tin pails at a cost of say twenty-five cents, one for holding cold water and the other hot, and if the milk is not at the proper temperature when taken from the vat, it can be raised or lowered, as the case may require, by placing the vessel containing the milk in the water without spending any unnecessary time, for there are times as all cheese makers know when a few minutes mean a great deal to them, and the working of the curd afterwards. Right here allow me to say, that I have always striven to impress upon cheese-makers the great importance of being master of the situation, as it were, and it is at this stage of the process, more especially, that we can accomplish it. It will not be necessary for me to describe the rennet test, as it is now generally well known, but I would say to cheese-makers in reference to it, never under any consideration neglect to use it, for I have always found it, when used intelligently, an infallible guide to determine the condition of the milk. If the milk is found by the rennet test to be over ripe it will be necessary to hasten the process by heating up faster, to keep ahead of fermentation, and if it is found to be working slowly or too sweet—so slowly that it will not be ready to set for say more than an hour after heating—I would advise using a starter, for we find a considerable loss in not being able to keep the cream down or stirred in sufficiently when the milk is long in ripening. Our method of preparing a starter, and which has proved very satisfactory, is as follows: We take of the best flavored milk which comes to the factory, say about one pail for each vat, heat it to from 86° to 90° degrees then add about one-half the quantity of pure water. (In case the water is not absolutely pure it will be necessary to boil and cool it). Stir well together, and set it away in a quiet place where it will not be disturbed until required for use. Practice will teach the cheese-maker when to add the water. Through the summer months, as a rule, we add it as soon as the milk is heated. In cold weather when the milk will be naturally sweeter, we let it remain an hour or so to ripen a little before adding. The questions may arise here, why add the water? and why not disturb the starter? To the first, I would say that by adding the water we obviate the difficulty of contending with tough, thick milk, which is very undesirable in a starter, for it is almost impossible to break ordinary thick milk fine enough to mix properly with the milk in the vat. White specks in curd and cheese have often been traced to this cause, as thick milk will not take color. Second, to disturb this starter at a certain time, is almost sure to cause a separation of the milk and water, and if this takes place the milk will be in almost the same condition as though the water had not been added. Never prepare a starter from milk which has been mixed in the vat, for, although you may have fairly good success by doing so, the risk is too great, and in nine cases out of ten you will miss it. Do not abuse the use of the starter for I know some cheese-makers seem to have the starter craze, using it far too much, which is a decidedly wrong practice, introducing so much acid into the milk, that it takes hours and hours to overcome this tendency to harshness in the curd caused by the excess acid introduced by the starter. They seem to have a mistaken idea as to its use. It should be considered

merely as a help. Some seem to have got the idea into their heads that by using plenty of starter and getting their milk to work fast, they will be able to get through early in the day. Now this is a mistake, unless you are content to make what we call acid cheese, which, those engaged in the trade will bear me out in saying, are not wanted.

We will consider now the question of ripening the milk, for we are convinced that on this point hang, as it were, our future destinies for the day at least. Milk should be ripened to that stage, so that, in from two and a half to three hours from the time the rennet is added to the milk there will be a certain amount of acid show on the curd by the hot iron test, say from one-eighth to one-quarter inch. Always set the vat in time to insure a thorough good cook on the curd before it is necessary to draw off all of the whey. The ripening of milk should never be carried too far, or to that stage that it will work too fast; if so there will be an unavoidable loss of fat in the whey. As I have said, heat the milk to 86°, because setting at a temperature much below, we are apt to have tender curd, curd that will require very careful handling in order to avoid waste. On the other hand by setting at a temperature much above, the curd is so hot that when cut it is apt to knit together, and requires more vigorous stirring, consequently more waste, fine particles of curd being broken off and lost in the whey. I do not think this question of waste in manipulating the curd receives that attention from cheese-makers on the whole that it should. It is something terrible to witness the cat-hauling curd does get sometimes by not a few cheese-makers.

Rennet, and applying it to the milk. When it is desirable to make a quick curing cheese, such as we usually make in the early part of the season, use very freely of rennet or enough, so that the curd will be ready to cut in from fifteen to twenty minutes. On the other hand if slower curing cheese are wanted, use less rennet, say enough for perfect coagulation in from thirty to forty minutes. Before applying the rennet it should be diluted in say not less than one-half pail of cold water. I know it is the practice with some to use warm water or water about the same temperature as the milk, but I think this is a mistake. When diluted with cold water, it does not act so quickly on the milk, and gives more time for a thorough mixing. When adding the rennet start pouring it in at one end and have it all in by the time the other end of the vat is reached, following up with the dipper immediately; stir constantly for about five minutes. If the milk is not working too fast, and will allow it, go over the surface of the milk with the bottom of the dipper for several minutes to keep cream from rising, and if there is any draft or cold air coming on the milk, it will be found a great advantage to spread a cover over the vat until ready for the knife. There are different ways of knowing when the curd is ready to cut; probably the most convenient and reliable is to insert the finger and push it along under the surface, splitting it with the thumb as the finger is inserted; and if it breaks or splits clean without appearing milky or riley, it is ready to cut. Start cutting by using the horizontal knife. To insert it, lay it on end of vat near the handle and let it cut its way down into the curd, never force it straight down the end of the vat as I have heard of some doing. When the knife has assumed its proper position, move it along carefully to the other end, turning it around cutting back facing the other way, never attempting to shove it sideways through the curd. It will be well to note particularly the position of this knife. It must be held firmly and not allowed to get out of plumb, for you will readily see that the curd will be torn more or less if such be the case. The curd should not be subjected to any undue pressure other than from the thickness of the blade passing through it. When taking the knife out, allow it to cut its way out in the reverse order to which it went in. Now take the perpendicular knife, cutting crosswise of the vat, and then lengthwise, which will leave the curd in small square cubes. This will be sufficient cutting, unless in the case of fast-working curd when it becomes necessary to cut finer. Before we leave the cutting, I would strongly advise all cheese-makers to look sharply after the condition of their knifes. See that they are sharp and no lumps of solder are around the blades, for any blunt surface coming in contact with the curd will certainly cause a waste, for every time the curd is cut or broken there is a loss of fat globules escaping into the whey.

Heating or cooking the curd. Start by stirring very carefully. Try to keep the curd as near as possible the same shape in which the knife has left it. I consider this a very critical stage in the process, and the greatest care should be exercised to avoid loss and keep the curd from getting ragged, for I have found again and again a loss of fat later in the process produced by not having proper attention bestowed on the curd at this particular time. After stirring say for five minutes, heat may be applied very slowly at first. If heated too quickly, it will cook the cubes on the outside, while they will be full of whey inside. If the cooking is done gradually the cubes will be cooked more uniformly and better results will follow. I have found that by taking a full half hour from the time the heat is applied until it is shut off does very well for ordinary working curd. Some authorities advise heating much more slowly, or one degree every five minutes. I think this slower than there is any occasion for. Setting at 86° and cooking to 98° means 12° or sixty minutes, or one hour, and that is quite a long time to have steam going on a vat. I would advise heating the curd to a temperature of 98° as a rule. While we find good cheese can be made heating all the way from 90° to 100° or over, I consider 98° the proper temperature. Always strive to have the whey clear and as free as possible from small particles of curd floating in it. Keep the curd stirred constantly while the heat is going on, and for some time after it is turned off to prevent the curd from matting; also to insure a more uniform cooking, for whatever theories may be advanced, we must have the curd fairly well cooked to make fancy cheddars. Those of us who have made cheese before the rennet test came into use will remember that occasionally a vat of curd would be too well cooked; on account of not having the milk in the proper condition at setting it would remain in the whey too long before the acid would develop, and as a consequence too much moisture would be expelled. The result was a dry stiff cheese, but there is no necessity for an occurrence of that kind again, for the intelligent use of the rennet test will enable any cheese maker, with normal milk, to have the curd just long enough in the whey to insure a proper cooking with the required amount of moisture and acid properly balanced. I would urge upon all cheese-makers, the necessity of using correct thermometers, it has been my lot to be sent to factories at times where they were having trouble with their cheese, and almost invariably I would find the thermometer wrong, sometimes as much as four degrees. While I do not say that this has been the cause of all the trouble, it has helped very materially in some cases.

Drawing the whey. This is a very important stage in the process. I always recommend drawing off part of the whey soon after the heating is completed. In the early part of the season we find it quite necessary to do so, so that we may not be caught by a too rapid development of acid. Through the summer months, when factories are liable to have tainted milk, by drawing the whey down to within a few inches of the curd and keeping it well stirred the flavor will improve very much. In the fall months it is still a good plan to practice, unless the factory is very cold, for when the curd takes on the proper amount of acid the balance of the whey can quickly be got rid of, which means a good deal sometimes. In fact all through the season the very great importance of having just the required amount of acid on the curd at dipping should be the special aim of every cheese-maker.

Dipping the curd, or, properly speaking, drawing off all the whey, should be done when the curd shows from one-eighth to one quarter inch of acid by the hot iron test. I would recommend the use of the curd sink, where there is room in factories for them, but in cases where there is no room, to use racks in the vats, which are much to be preferred to the plan practised by some of just packing the curd on the bottom of the vat.

Stirring or draining the curd. It is a little difficult to say just how much to stir curds at dipping, for the moisture leaves some much more readily than others, and just here the skill and good judgment of the practical cheese-maker will be called into requisition, for no one or two rules can be safely applied at certain stages of the process; the knowledge must be gained by experience and close observation. However, I would say, that the practice of stirring *very much* at this stage is objectionable. I have found a great waste in stirring a moist curd too much when dipped. It is better to let it stand

for a little and break it over carefully afterwards. When the curd has been sufficiently drained spread it evenly on the racks about from four to six inches deep, and allow it to mat, and when sufficiently matted, cut or break into convenient pieces for handling, which may be determined largly by the curd mill in use as to feeding it conveniently. If the mill used be one that tears, or injures the texture of the curd, causing loss of fat, break the curd into small pieces, and the result will be less waste, for this matter of waste should be kept in view at every stage of the process. Keep turning and reversing the curd at intervals, to expel more thoroughly any surplus whey; turn it more frequently at first. It may be piled two and even three deep to advantage, if it has been drained properly, which will be shown by the amount of whey collecting around the blocks. Never allow any whey to remain on or around the blocks of curd. As soon as whey is noticed turn and reverse position of curd allowing the whey to escape. The temperature should be kept up if possible at this stage, to 94° or over, to facilitate the ripening of the curd.

Milling the curd. Generally speaking I advise the milling of the curd about half the length of time from dipping to salting. The acid at this stage should have developed to about one and a quarter inches. However, this may have to be varied considerably, as in the case of a moist curd, or one that is developing acid very quickly, it will be necessary to grind early which will greatly facilitate the expulsion of the whey, and give the cheese-maker better control of the curd. On the other hand, if a curd is ripening slowly by being too cold, and not enough of acid developed, defer the grinding for a little or until the curd becomes somewhat flaky. It would be presumption on my part to say what make of mill to use, for we have several good mills made in Canada at the present time, and each one has its advocates, who claim superiority for their favorite mill. However, I would say use a knife mill, and one that cuts the cleanest and most evenly, with the least friction on the curd. After milling, just stir curds sufficiently to keep from matting, and never mill the second time unless in the case of a very bad gassy curd, which by cutting it up finer will hasten the process somewhat. When it becomes necessary to mill the second time, do it immediately after the first milling, for if the curd be allowed to ripen before grinding the second time a great loss of fat will be the result. As the process goes on, from milling to salting, allow the curd to cool gradually, so that when it is ready to salt, the temperature may not be too high, say about eighty-six degrees to eighty-eight degrees. The condition of the curd when ready to salt is determined principally by the feel. When pressed in the hand, it should feel mellow and silky and present a glossy appearance to the eye, and the hand should feel distinctly greasy when the curd is dropped from it. Do not make the mistake that I have known some to make of salting the curd as soon as grease would show by pressing in the hand. It will very often show soon after grinding, especially if the curd has not been handled right in the former part of the process. I would say as a rule let one hour at least intervene between milling and salting.

Salting the curd. This should be done with great care. First be sure that you have a recognized pure quality of salt, have the curd as near as possible of even depth over the sink, and see to it that the required amount for the vat has been carefully weighed out, which will vary according to the condition of curd and season. See that all lumps and specks, if any, are taken out, for cases have come under my observation quite frequently where the salting has not received that attention which it deserves, considering its importance it is done quite often in a slip shod way. Spread the salt on about one-half evenly over the curd; then rub it well in on the surface; then mix thoroughly; spread curd evenly again and apply the balance, rubbing in and mixing thoroughly as before. Stir it over again in about five minutes and again before starting to hoop. In from fifteen to twenty minutes the salt will be mostly dissolved, and the curd will be ready to hoop, having lost that harsh feel which was quite noticable just after salting.

Hooping the curd. I would advise every cheese-maker to provide himself or herself with a convenient pair of scales for weighing the curd, and weigh it all carefully into the hoops, putting the same weight in each, thereby insuring a more uniform lot of cheese in size and weight; for what looks more unsightly than to see a lot of cheese together on

the shelf of all sizes? Use a seamless bandage one-half inch less than the diameter of hoops. This will hold the cheese in better shape, and prevent any bulging out on the sides. It is advisable, as soon as curd is hooped, to put the press cloth and follower on, thus preventing the possibility of the rind becoming too dry by exposure to the atmosphere. The temperature of curd when put to press should be from eighty to eighty-five degrees. If put to press too warm, we are apt to have huffy cheese, also large slick round holes. On the other hand, if too cold the curd will not unite as readily, and more difficulty is found in getting a good close rind. It also necessitates heavier pressure.

Pressing the cheese. This is another very important stage in the process, and I would say be careful. Apply the pressure very slowly at first—merely start the whey. If applied too strong a lot of fat will be pressed out with the whey, while if the pressing is done carefully that will be retained to a great extent. A good rule is to observe the whey closely as it comes from the curd, and when it begins to run somewhat clear, the pressure may be safely applied, which should be done at intervals until complete.

Dressing the cheese. In about one hour they will be sufficiently pressed for this. Take off the hoops and draw the bandage tightly up, and see that it laps over evenly at both ends three-quarter inches. Have nice clean cap cloths on hand, and use one for each end. Spread them on smoothly, so that no wrinkles will be seen, and before putting back to press examine the sides of the cheese, and if they show a defective rind or any grease noticable on the bandage, wash and soak them well with good clean hot water, which will help very materially in closing and making a good rind. The water used in dressing the cheese should always be clean and hot. I am satisfied, if this were looked after more carefully, we would not hear so much fault found with defective rinds and cracks under the bandage. How is it that we find, more especially in the fall of the year, some cheese from the same vat with good rind while others are badly cracked? Largly on account of want of thought on the part of the cheese-maker, the latter part of the curd having been hooped at a lower temperature than the first, and requiring different treatment at the time of dressing, by making more use of the hot water. Besides using a cap cloth on each end, I would advise the use of press cloths as well. When put back to press see that they are straight and even under pressure, and apply good, heavy pressure especially when left for the night. The first work in the morning at the factory should be to press the cheese, taking up the slack. Then in about one hour remove the hoops and examine them carefully for defects, the most noticeable and common of which are shoulders or edges of cheese sticking up caused by defective followers, which will have to be pared off, and the bandage neatly replaced, and quite often the rind will have to be treated to another dose of hot water to soften it well before it will be perfect; for a perfect rind on cheese is a thing of beauty, and, I may add, a joy as long as we behold it. After having attended to all these points, which are indispensable to the production of gilt edge cheese, put them back to press, reversing the ends, thereby giving them more of an even and stylish shape, and be sure they are pressed evenly and straight before leaving them, so that there will be no putting back to press again when the time comes to remove them to the curing room, as certainly should be done if not straight and perfect.

THE HANDLING OF OVER-RIPE MILK.

Mr. Robert Johnston, of Bright, came next with the following paper: I will not say that the method that I pursue in handling over-ripe milk is the best or the only successful way of handling it. What I will to say is that it has given me the best results. I do not approve of accepting milk that is turned or has developed too much acid. But we get caught sometimes. It is then that we want to know the best method of making a marketable cheese out of milk which if handled in the ordinary way would make an inferior cheese. Heating my milk to eighty-six degrees, I test it with the rennet test to ascertain how fast I will have to move to keep ahead. As a rule I color a fast vat one-

eighth ounce more than one working in the ordinary way. I use the usual amount of rennet. I find that to increase the rennet does not allow time to thoroughly incorporate the rennet with the milk before coagulation sets in.

I commence cutting as soon as fit, and cut continuously until I have cut five or six times. I start to heat as soon as I stir curd from the bottom of vat. Heat in no less than twenty minutes. Start to remove the whey as soon as heated. Test curd by the hot iron test. If it shows $\frac{1}{2}$ to $\frac{3}{4}$ inch of acid in fifty minutes from the time the rennet was added do not handle it in the ordinary way. Stir it two or three times after dipping, and then salt it about one pound to the thousand of milk. Stir the curd dry, and you can let it mat. Cut and turn in the ordinary way, for you have control of your curd and can handle it a an ordinary curd.

Now the advantages I find in the adding of the one pound of salt are: it checks the acid and expels the moisture, gives you control over your curd, preserves the color and texture, and makes a good marketable cheese out of milk which, if handled in the ordinary way, would have made an inferior cheese.

Mr. PAGET: In regard to the dipping, would you advise that in all and every locality? In our locality we do not seem to be able to get sufficient body after we dip it, with the acid you have spoken of—$\frac{1}{8}$ to $\frac{1}{4}$ inch.

Mr. BELL: Some cheese-makers would say that $\frac{1}{8}$ was $\frac{1}{4}$. There is a great deal in the way in which they put it on the iron. I always think $\frac{1}{4}$ inch sufficient. I have never found any difficulty in getting plenty of body to my cheese with $\frac{1}{4}$ inch of acid. I happened to be in New York last summer for a few days and I found that curds out there would stand more acid than ours—that is at dipping—without being injurious There I only gave $\frac{1}{4}$ inch to the cheese I made, while I found it all right with plenty of body, but there are sections where the curd will stand more acid than $\frac{1}{4}$ inch.

A MEMBER: I have talked to cheese makers who have come from the west, and they tell me the acid which would answer in this section would not give the same body down there.

A MEMBER: I have made cheese in Oxford County, as well as in other parts of Canada, and I have found that $\frac{1}{4}$ inch of acid when dipping cheese is sufficient to give a good body in all the places that I have been.

Mr. EAGLE: Did you not say that some makers would call it $\frac{1}{4}$ inch, others would call it $\frac{1}{2}$ inch.

Mr. BELL: Yes; it is the way it is placed on the iron.

Mr. JAMES: Your opinion is that the same amount of acid with the hot iron will do in every locality.

Mr. BELL: Yes.

Mr. JAMES: That is my experience too. My belief is that they don't do the right thing with the iron.

Mr. BELL: It all depends upon the milk you have got. With gassy curds a little more acid is required; $\frac{1}{8}$ is quite sufficient in a great many localities. I think we get the better flavored cheese the less acid we use at dipping.

A MEMBER: In the cold weather if your factory is cold would you not advise a little more acid?

Mr. BELL: Yes, perhaps so; but I would advise some other means of heating your factory. Burn a little more wood and you will improve the quality of the cheese. It is a dangerous practice this of giving too much acid.

Mr. MCLAREN: With regard to curing cheese in the spring and the fall, I find much difficulty, and I would like some information.

Mr. BELL: In the spring time we keep an even temperature of seventy degrees, and if that is maintained we get our cheese ready in about two weeks or ten days. In the fall I find an even temperature of sixty degrees the best. Very often the curing rooms are

allowed to cool down during the night, and perhaps in the morning they are down to fifty, and it takes half a day to get the cheese into the same condition as it was the night before. If an even temperature of sixty degrees can be kept up in the fall it is preferable to a higher temperature. A temperature of from sixty to sixty-five is plenty.

Mr. JOHNSTON: In the majority of the factories of this country is it not almost impossible to keep an even temperature?

Mr. BELL: Yes.

Mr. BLAYNEY: Why do the cheese men receive milk that is not first-class, and continue to blame the patrons for sending it? I would like to know that. We find the grocers accepting bad butter; they seem to be afraid to refuse bad butter. And so it is with the cheese-makers. As long as they continue to receive bad milk, so long will they get bad milk.

MR. BELL: I do not think that as a rule cheese-makers will receive bad milk. It sometimes slips in, but I think they are only too glad to return bad milk when they detect it. When the milk is very cold coming to the factory it is pretty hard to detect all the defects. The milk saved over Sunday is generally cold.

Mr. WHITE: Have you had any trouble at certain seasons with your curd losing a good deal of butter?

Mr. BELL: Yes, I have had trouble in that way. I think the chief cause of that is the milk getting abnormal. There is an excessive amount of fat along in August, and if the milk and curd are not handled very carefully you will lose that fat.

Mr. WHITE: I have noticed it generally in August.

Mr. BELL: Well, the milk is generally in an abnormal condition.

Mr. WHITE: How much salt would you use on a fast-working curd, say in August? Would you use more or less?

Mr. JOHNSTON: I would use the usual quantity.

MORE ABOUT THE HOG.

Mr. THEODORE LOUIS was again introduced to the audience, this time by Prof. Robertson, who referred to him as "my old master," and spoke very kindly of him. Mr. LOUIS came forward, and after remarking that he felt flattered at the words which had fallen from the lips of Prof. Robertson, continued his address on the hog. He said: My friend Mr. Robertson gave me a ride this afternoon through three or four miles of your country. It is the first time that I have seen Canada in daylight. I have been delighted with the substantiality of your buildings, and your barns, and I think when I took this morning the subject of hog houses and shelters that I probably made a mistake. From what I have seen this afternoon I imagine that you are well fixed so far as shelter for your hogs is concerned. I left my subject this morning on the question of condiment for feeding. Some of you who are feeding swine may not think it essential to have a condiment in the feeding system. I will give you an explanation. You will generally find that when we are finishing off the hogs for the market, and especially when we are feeding them on one kind of food, that then they will root, and then comes in the necessity of a condiment. I had once forty hogs—shoats. I was finishing them off, and they were weighing two hundred and fifty pounds when eight months old. I was going to make a trial, because a great many men had said that it was simply my imagination that there should be a condiment before our hogs in order to give them better health, and aid them in digestion. Let us remember when the animal is ripening for the block the digestive organs are loaded with fat more or less, and that the pigs are losing their power of assimilation and digestion. There were forty-eight shoats at the time of my trial. I weighed out eight pounds of shorts, and I gave them a pailful of the charcoal

that I told you about this morning. I always find that the nearer a hog ripens for the block the more eager he is to eat either sand or something of that sort. It is simply that there is a want of power for assimilation and digestion. I weighed out sixty pounds of sandstone each twenty-four hours, a pailful of charcoal and eight pounds of swill. These hogs were fed upon the feeding floor. We have one in our hog house, so that in fine fall and spring weather we feed everything on the floor. I think feeding on the ground is a wasteful process. In the twenty-four hours these hogs used sixty pounds of sandstone, and a pailful of charcoal, but they did not consume in that time eight pounds of swill. The swill would last from forty-eight to sixty hours, so that I found that they did not really need that amount of swill. I simply make this statement to show the truth of the assertion that we must aid the animal under a system of high feeding.

A MEMBER: Do you boil the feed after you grind it?

Mr. LOUIS: We have made experiments in boiling feed. We use a steamer in our hog house. We gain nothing by boiling feed, but we gain considerable if we bring our water to a boiling heat, and then put the feed in and feed it in winter time at from eighty to ninety degrees. By this means we artificially supply animal heat. While the experiment stations say it does not pay to heat the feed, I say it does in this manner. But it never pays to put it in a barrel and boil it for several hours. Remember that one hundred pounds of shorts or one hundred pounds of cornmeal or any grain will make forty-two gallons of whiskey. When you go to work and boil your feed for any length of time you are simply evaporating your sugar from your grain and you are not a gainer. You are evaporating all the time substances out of your grain. The feeding of a brood sow while she is nursing the pigs is an art. But there are few men that realize this. The brood sow on my place has to take the place of the cow on the farms of you dairymen. A brood sow will give as much milk during twenty-four hours as an average cow. Now, do not ask me if I have ever milked one. (Laughter). I want everyone of those within my hearing to have a pair of scales handy when they are feeding their pigs. A pair of scales now-a-days can be bought for twelve dollars. A pair of scales and a lead pencil is a better educator than I would be if I were to talk here for a day. When the litter of pigs is born take them ten hours or four or five hours after they are born, and put them on the scales, and you will find that they weigh from twelve. fifteen to eighteen pounds according to the size of the litter and the age of the sow. You weigh these pigs every twenty-four hours, and you will find that they have made a gain of from two to five pounds according to the ability of the sow to give milk. So you see, gentlemen, I am looking for a milker, just precisely the same as you dairymen are. I want to say, especially to the young men, that when you are making a selection of an animal you should get a milk-giver, for it is with the sow that the young pig gets his first start in life. When we are feeding a sow we should feed her with an eye to milk production, just as you are feeding the cow for milk production. It would be a great mistake to feed your sow on ground meal or corn alone. She must have them mixed. There is where the mistake comes in. The change of feed will always be a question in the art of feeding. One kind of feed will never give us the same satisfaction as when we are gradually changing it. My pigs nurse three months or ten weeks. They must wean themselves. You probably in your dairy business wish to wean them earlier. I do not believe in feeding the pigs separately in the trough. I adhere to the principle that the pigs should learn to eat with the dam. When they become accustomed to a course of feeding along with the dam's milk you will never have that back-set that you otherwise would have when you take them away from the mother. We should always endeavor to have our sows brood as near as possible together. Then we have the young pigs altogether. One of the great things is to have hogs all of a size and age. When we can put them on the market all of a size and age a buyer will never refuse a few extra cents.

A MEMBER: How would you prepare the feed for a sow that was nursing the pigs?

Mr. LOUIS: My favorite feed for a sow that is nursing pigs is shorts mixed. If the sow is a sow that weighs from three hundred to four hundred according to her size and age as a matter of course we must then ever feed to supply as many pounds. I

prepare two parts of shorts and one part of cornmeal. I steam this feed in the same manner as I said before. I feed it warm. I find that in the month of April and especially in the earlier months of the year, when the temperature is low, when I feed the sow warm feed of from eighty degrees temperature, that she will keep healthier. In this wise I change the sow's feed, If I have mixed barley meal and corn meal with the shorts I always add a little oil meal to that ration. Even with oil meal at twenty-two dollars you will find that it pays you to add it to the cornmeal. Nothing could be worse than to have your sow grow constipated, because it would cause constipation in your pigs. I never would add milk to any steamed or boiled feed until I feed it.

Mr. MALCOLM: You believe in feeding your pigs with the dam?

Mr. LOUIS: Yes. Another thing: when I want to teach my pigs to eat with the sow, I go through the alley in the morning and I take a handful of oats and I throw some into each stall. A pig is naturally very inquisitive, and when they hear the oats drop on the floor they will pick them up, crack them, turn up one ear and look very wise, and that is the first lesson the little pigs get to eat with the dam.

A MEMBER: What is the floor?

Mr. LOUIS: My floor is a wooden one. That brings something into my mind. Feeding of soil must go hand-in hand with feeding of live stock. I live upon a very sandy place, so sandy that it sometimes drifts, and yet you would be astonished at the wealth that I produce there. I calculate that while I feed my hogs I must be feeding my lands, and I save the manure for that purpose.

A MEMBER: Do you ever use concrete for floors?

Mr. LOUIS: I would not want a concrete floor in my hog house for breeding purposes. A concrete floor would be too cold at the time of farrowing, and your pigs would become chilled, and you would be very apt to lose them. Therefore I would rather have a wooden floor.

A MEMBER: How far above the ground would you put the floor?

Mr. LOUIS: About a foot from the ground.

A MEMBER: What direction do you prefer the drainage of the pen to take?

Mr. LOUIS: My floors are level. I would not want any drainage in my hog house. It is said that the hog is the dirtiest animal there is upon the farm. I say it is cleanest animal that ever was upon the farm, and I except no animal.

A MEMBER: Is your yard paved?

Mr. LOUIS: My yard is not paved, but it would be a good idea if you could pave the yards with blocks. We clean our stables just as regularly as we would cow stables. Prof. Henry says that I steal my wife's broom to sweep out my hog pen with. I know that a new broom sweeps awful clean. (Laughter). Along the fence we put out new bedding every morning. We find that the sow uses this for her droppings and every cussed little pig follows her example.

A MEMBER: Have you had any experience in the use of stone pens?

Mr. LOUIS: If I was going to build a stone pen I would build a double wall and and leave a space between, because if you do not, you will have a damp stable, and the great trouble would be that you will have more or less rheumatism in your pigs. I spoke just now about feeding shorts to the sows. You probably raise great quantities of oats, and it is generally said that oats are good feed for pigs. I say they are not. The pig is different to the cow, and you do more injury than good by feeding young pigs on ground oats. When you use shorts you have economy, and a feed that gives better results.

Mr. PETER SMITH: I have fed sour whey and have been successful.

Mr. LOUIS: Probably you have never taken an account of the grain that you fed with it. If you had fed one of the pigs on grain mixed with sweet whey and another lot

on the sour stuff I think you would have found that you would have made better results out of the sweet whey than you did out of the sour whey. I have said that it is desirable sometimes when finishing off the pigs to feed them on sour whey.

A MEMBER: Have you any experience in feeding roots?

Mr. LOUIS: No swine feeder, I care not if he is a dairyman or not, should ever go without roots, especially for winter purposes. In winter we go upon our barn floor and we gather up the clover leaves and the clover heads, a barrel full every morning, and we carry it to the hog house. We fill the barrel with water and we put a steam hose in and bring it to a boiling heat, and then mix grain with it. We find that we can winter our pigs and brood sows better in this way than in any other. Aside from this, each of our hogs during the winter receives a root. We are great people to grow squash. We grow an acre or two simply for the purpose of feeding. We do not grow them in the corn any more.

A MEMBER: How would pumpkins do?

Mr. LOUIS: Pumpkins are not as good as squash. They retain more water, and when you are fattening your hogs and can feed the one against the other, you will find they will leave the pumpkins and go for the squash. I use the old variety of squash.

A MEMBER: Has Mr. LOUIS any experience in feeding corn ensilage?

Mr. LOUIS: I have had no personal experience. Two or three years ago I was in Minnesota, when the man in charge of the insane asylum farm, which is one of the finest institutions in the State, came to me and said: "Mr. Louis, ensilage is the finest feed for hogs there ever was. I am wintering all my sows on ensilage?" I told him that I could not imagine that there was enough in ensilage to sustain the life of the sow, and warned him that if he continued to feed it his pigs next year would be born without hair and otherwise deformed. It may be good to feed ensilage in the winter as a change, but as a regular feed it can't be depended upon.

A MEMBER: What breed of pigs do you consider most profitable?

Mr. LOUIS: The one that gives me the greatest return for feed consumed. (Applause.) When we come to talk about breeds, we talk about a fancy. It is simply a point of fancy with every man. I would say let every man independently choose his own breed of hog—that which suits him best, that which suits his market best, that which gives him the best results.

A MEMBER: Have you fed artichokes?

Mr. LOUIS replied that he had, he was sorry to say. His first experience with artichokes was enough for him. He planted a couple of acres, and the first year he got good sized artichokes. Then they kept coming up year after year for five or six years—little things about the size of a hazelnut—and it was the greatest difficulty to keep them from spreading all over his farm.

A MEMBER: What about diseases of hogs?

Mr. LOUIS: Almost all the diseases that the human being is subject to the hog is subject to. He is subject to typhoid fever, measles, colds and hundreds of other diseases, and most of them are caused by injudicious feeding. For instance, probably one of the greatest complaints among your hogs is paralysis of the loins. You know, the hog that drops right behind and drags his feet after him. I presume I hit a good many men just now. That is simply the result of feeding. While the hog is the quickest of digestion of any of our animals, remember that when you stuff the animal to excess and feed injudiciously without any condiment or salt or feed your dairy product without any grain, you are injuring him. Constipation sets in and then you have the first step towards disease. As for colds, we know when we take cold. Let that observation be followed out in the case of hogs, and then we can avoid those little diseases that so often destroy the lungs of our hogs. It is better to avoid them than to look for remedies.

A MEMBER: How do you feed your roots?

Mr. LOUIS: I feed them raw, but when we have a great many, like we had this fall, we steam them and then mix the grain with them.

A MEMBER: Where do you steam them?

Mr. LOUIS: We have a steam cooker that cost $35, and it takes us only about thirty minutes to set a barrel of water boiling.

A MEMBER: Do you cut or pulp the roots?

Mr. LOUIS: We cut them with a spade, and then we cook them thoroughly, so that they almost pulp themselves, and then we mix the grain with them.

A MEMBER: How often do you approve of feeding the hogs?

Mr. LOUIS: That is a good question. In winter time it is not well to disturb the hogs before daylight. I found that by experience. As our days are short, I believe that twice feeding in winter is better than feeding three times, but in the fall of the year and in the summer it is better to feed three times than twice. Feeding is one of the great arts. The trouble is that men feed a great lot of stuff all at once—more than the hog can consume. Let it be the maxim on every farm, no matter what the feed, never to give the hog any more than it will eat clean and go hungry to its next meal. Then you will find that you will make better growth on the young pigs, and that you are fattening your animals in a way that will make more gain.

A MEMBER: What is the best time of the year for farrowing?

Mr. LOUIS replied that that depended upon the shelter that was provided for the hogs, and on how good a man the farmer was to take care of the sow. To illustrate this last point he showed that by overfeeding, a whole litter might be killed. He touched upon the importance of using caution in feeding the sow. She should be liberally fed, but not to excess. The pigs should have plenty of fresh air and exercise. The latter could be provided in the pen with the aid of a hazel switch when the weather was too stormy for the pigs outside.

A MEMBER: Is there any remedy for paralysis?

Mr. LOUIS: The only remedy that I know of is to take turpentine or any liniment, and pour it freely over the loins of your hog. Keep the animals in a warm quarter and give them something that will have an effect on their bowels. There is a constipated condition, and you must relieve the animal. For general information, I may say that if you have a sick hog, and you must give him physic, give it to him this way: Take a piece of boiled pork and slice it about the thickness of my fingers. Then split it and put a few grains of calomel in. First, give the hog a little piece of the pork without the medicine. A hog must be pretty sick when it won't eat a piece of boiled pork. Hold it before him and he will swallow it. Then give him the other piece of pork with the calomel in it. Away it will go like the first. That is the nicest way of giving medicine that I know of.

A MEMBER: How many grains of calomel?

Mr. LOUIS: According to the size and weight of your animal. You can give a hog at least four or five grains more than any man could take. Of course, you must consider the age of the pig. I am not here to advocate giving medicine to your hogs. I am advocating here to-day judicious feeding without medicine.

A MEMBER: How do you manage milk fever when you have it?

Mr. LOUIS: You will have milk fever in your brood sow if you have fed her on a heating food before she farrowed. If you have fed her on barley or on corn, and have confined her, you can depend upon it that at the time she goes down to farrow she will have milk fever; her udder will be hard and caked. At these times you will find that she rises right up and refuses to let the pigs nurse. She stands right there and stares at them, and when she cannot relieve herself at all she then goes to work and eats her own pigs. There is a law of nature that teachers her what will give her relief. The only way that I know of to relieve her is to give her a lot of linseed oil. Pour it in some

milk on feed. Then get some hot water as hot as your hand can bear it and kneel down beside her. With a cloth bathe her udder in the hot water. She will have a fearful pain, therefore be careful. Keep washing the udder for about half an hour at a time. When the water cools get some more. Afterwards rub with liniment, and then I think you will be able to save your sow. Farmers often make another mistake. As a rule when a man sees a litter of pigs in his stable he is so pleased that he gives the sow an extra feed—the biggest she ever had in her life. He goes into the stable next morning, and then the chances are he will find that his sow has milk fever. She will refuse to let the little fellows nurse. Care should be taken not to give the sow much milk-giving feed until the little ones are able to take care of the milk. When you hear the little pigs squeal for the milk, and become hungry, then you can increase the feed from day to day. Give the sow immediately after farrowing a handful of shorts with some water, and you will find that you will never have any trouble.

A MEMBER: Have you any experience in feeding corn cob meal?

Mr. LOUIS: If you grind it fine—the cobs should be ground as fine as the corn meal—you will find that you can make precisely the same live weight gain out of a bushel of corn and cob meal as you can out of clear meal. The cob meal is an aid to digestion. But it should not be fed dry; it should be fed wet. There is no profit in feeding any kind of meal in a dry state. Another point is that hogs should be fed regularly. If you feed at eight o'clock to-day you want to feed at eight o'clock to-morrow; if at four or five o'clock, at that same hour the next day and right along. You will be surprised what a difference it makes in the gain of the hogs.

A MEMBER: At this time of the year would we feed at seven, twelve and six o'clock?

Mr. LOUIS: Those would be good hours.

The meeting then adjourned until the evening.

SECOND DAY—EVENING SESSION.

The Opera House in the evening was filled, and the session was a most successful one.

The PRESIDENT opened the meeting with a few remarks on the value of conventions. He said, in part: There is not a student of the high school here who is more of a student than the farmers who come to attend the meetings of this convention. They are students in the best sense. They realize the truth of the biblical phrase that they have to earn their bread by the sweat of their brow, and not by the sweat of their backs. I believe that such a convention as this is one of the most hopeful signs that we can see in this country at the present day. We hear a great deal now-a-days about depression in agriculture, and there is not the slightest doubt that there is a depression in agriculture, and a depression in almost everything else. One thing is certain, we have got to take things as they are. You cannot get out of agriculture; it always will be the basis of our prosperity. In order to make agriculture successful, it is more necessary now that the farmers should be students than ever it was. This country is not going to go down, nor is the dairy industry going to go down, in spite of all the difficulties, as long as the dairy farmers of this country, young and old, meet together and consult each other with reference to their mutual interests, as they have done yesterday and to-day, and as you will see them doing to-morrow. It shows that their hearts are in their work, and that they are eager for instruction and knowledge.

CARE FOR THE COW AND FEEDING HER FOR PROFIT

Mr. JOHN GOULD, of Ohio, then delivered the following address :

An almost radical change in the care of the dairy cow in the last twenty years has carried her almost into the domains of the tropics, for now every effort of the advanced dairyman is to give his cow 365 days of June weather, and as far as possible give her food throughout the year rich in character and full of succulence, and so place it before her that she may eat it with as little effort as may be, so that every energy, save of the propulsion of the organs of life, can be economised and turned into the channels of milk production. That the care of the cow is a leading factor in the question of dairying, if the matter of profit is considered, cannot be doubted, but at the start I disclaim for care and feed the title to all success, for there are cows well and ill-bred which, care for them as one may, and feed them into the domain of fatness or disease, that can never be made to attain to good dairy performance, for the reason that they did not have born capacity of large performance, and no after feeding or care can create new possibilities for these cows. Nature never builds over the milking organs of a cow, nor fashions on a sort of side delivery where richness can be added to milk at the owner's request any more than feeding and care will make a Shorthorn steer out of a native "browse eater," or liberal feeding of oats put speed into a flat-footed clay-eating colt.

So if a profit is to be looked for in the care and feeding of cows, there must be a selection at the start, and let us see if it is not possible to get our stalls full of cows that give not less than 6,000 pounds or more each of four per cent. milk in the year, and cows that have the individual power to turn food and energy into milk and not into undiscoverable channels, a sort of underdrain that saps the very life-blood of the business and breeds discouragement, and often ends in putting up the shutters to our business.

The breed of cow that we shall care for is not my purpose to discuss here beyond this, that she shall be a good one and adapted to the dairy business in hand. Everyone has his likes and dislikes. A big black and white might suit me, and not you, and so on through the list. But this is patent : It costs no more to care for and feed a good cow than a poor one, and try to feed great performance into her and fail at the end. Its no use to feed and care for a cow to give 10,000 pounds of milk in the year that will put no more solids into her milk in the year than another that will do as much with 6,000 pounds, unless one gets the pay in the fun of milking two or three tons of water for nothing. So in the care of cows, there is the item of labor against production, and the fellow had better put the three days spent in milking the water into better care and feeding of the cows that give less but better milk.

In this care of the cows one is quite as likely to overdo as to fail in doing enough. It is a question of when, how and what variation.

If the best results are desired there must be a care of the cow the entire year, and this has its twofold influence, first upon the cow and on the future offspring, for it is in the care and development of the cow that we are to look in a measured degree for improvement in future generations of stock. It now seems assured that this pre-natal influence must be looked to as a means of steady improvement of our stock for the advent of a sort with prepotency so strong as to actually beget a new breed, as in the case of old Justin Morgan, the Hamiltonians, and quite as possible in that great bull, the father of the Durham cattle, which is only the gift of a century. So in practice it is always the better plan to begin in the care of the cow years before she is born and have what might be called the "heredity of care" made conspicuous all the way through. I am in doubt if the time will ever come when it will be best for the farmers at large to possess dairies of all thoroughbred cows, and, from what I can gather, what are known as broken bloods are in general terms the best. But there must be a qualification to this term, for it is in breaking bloods to extreme degrees, that is, without order or judgment, that has given us herds of cattle that are so broken up in their blood that they are veritable

scrubs. In our care of stock we must take this matter into consideration, then select the breed we wish and practically stay by that breed or nothing. But here comes in a factor. The farmer says "I have a fairly good herd now of the selections of years of dairying." Good! Select them all over with scales and butter test. I say butter test, for whatever use the milk of a dairy is to be put, the fats in that milk will always be the basis of calculation of its value. Water makes neither butter nor cheese. Then select a dairy breed that suits you. Get a sire and begin to breed and select, but do not break the blood any more. Two ways will effectually break it up yet more. Breed the second time from a bull from this broken blood, and array forty forces against the one strain, or go and bring in yet another distinct breed and break the first cross in twain. Better by far to retain the sire of the first cross and breed his own daughters to him, and intensify the blood you already have, and get into this breeding in line, and so get a second generation with seventy-five per cent. of the blood you desire. To cross thoroughbreds is a mistake. The cross always results in a compromise—especial richness is never imparted to a tub of water—and at the second cross the breeder is at a standstill. He must now choose which of the breeds from which to make the second choice, and to choose either is to confess that the first was a mistake, and that the first steps must be retraced. I do not champion any one breed of cows as superior to all others. Breeds have their places, but great dairies, whatever their breeding, are groups of selected cows, each cow representing herself, an individuality born with her, which may or may not be transmitted to her daughter; but quite as likely an inheritance she will give in trust to a son, to be given over to a second generation.

There must be a work of preparation on our farms if we are to attain high results with our dairies. Our farms must be put in order so that we shall grow not only good crops, but crops that we can employ to the best advantage. It means draining the swamps, getting the stagnant and foul water off from the land. It means some hard work, but in the end your farm will look enough better to pay for picking up. Have you ever seen a man with a profitably good dairy on a poorly cared-for farm? Never in the world; and so this care of the cow must have with it the care of the farm. The farm must also have conditions to correspond with what is going to be demanded of the dairymen of the future. We must have a condition of 365 days of summer on the farms. Care of the cow now means that we must have a warm, comfortable barn, well arranged so that when the cold weather begins we can shift this cow from a summer condition to an artificial condition approaching summer. I think the excavated bank barns have had their day and will disappear, and that the cowstable of the future will be on top of the ground—a wooden structure, double walled, well lighted, warm, dry, and free from dampness. These things I have never seen but once in my life in a bank-ground stable, and that was where the man had gone and built another wall of lumber inside the stone walls. If you are going to be a dairyman, and dairy 365 days in the year—and the dairyman of the future is going to do it—even have to—you must have a barn that will present summer conditions. When we get our barn double-walled, with its air space, plenty of windows to make it bright and comfortable, and well ventilated, then if we are bringing in summer-like feeds to our aid, and will use these summer rations to support the cow, we shall succeed very well in saving some of this feed that has cost us a great deal to raise and has only been used as an air warmer. This brings us to another question about the stable. We must make the cow comfortable in the winter. How does the cow do in the field? Did you ever notice? She goes and eats till she fills "her silo" full, and then she lies down in a comfortable place, chews her cud, and assimilates that food and turns it into milk. Have you ever noticed this cow in the summer time start and walk around the farm for exercise? We want to do something to make this cow just as comfortable in the barn as she was out under the tree in the pasture ruminating, digesting and assimilating that nice feed of blue grass. The method of tying a cow up in rigid stanchions is out of date, but not abandoned. I don't know but that a cow can get used to that after a while, so that she likes it. Men have been shut up in a dungeon for twenty years and lived through it, and their gaoler said they were doing well. But the question is not one of money. The other fellow was tied up for another purpose. Here it is a question of tying up a cow

to make money out of her, and we can't do it and get the best results of the feed unless we make the cow in every way comfortable. And so I have come to the conclusion that it is best not to stanchion at all. We find out that all through life we have been doing a great lot of hard work, here and there, that never paid us. There was a simpler and better way to have done it if we had just stopped and thought. Give your cow a halter with a little slack, a nice bed, clean and warm, and light stables. Then we pretty closely approach that point when this cow laid down under the tree in the pasture. Do you say to me that cows tied with a halter cannot be kept clean? Theodore Louis, at a Minnesota institute, was asked the question why it was that so many people had such filthy hogs. "Did you ever notice," said Theodore, "the character of the men that owned them?" He meant that the hog was filthy because the men owning them gave them no chance to be otherwise. I think the cow will be clean in the barn if the man who owns the barn will give her a chance. The whole thing to me is very simple. It is simply a matter of making the manger low in front—eight inches high—and then it means a smaller gutter than we are usually using in our barns. Make the floor, save a fourteen-inch wide heel plank, of thin cut inverted sods, and use a fair amount of bedding. The next thing is the question of water. How many times does a cow drink in a day? That depends! I asked a man over in New York how much a cow drank, and he said she "drank all she could hold generally." There are very few men compared with this one who know how much a cow will hold. By observation and weighing I have found that every cow in my barn drinks on an average ninety pounds of water every twenty-four hours, and some of them by weight have drunk one hundred and forty pounds. And then the ways of drinking. We have cows that by actual count drank twenty times in twenty-four hours. They were drinking every little while. And then we had cows that only drank twice a day, and others that drank four or five times a day, and others who only drank once a day under some circumstances. The man who is going to make money out of his cows must provide so that their individual wants shall be met. This cow which wanted to drink twenty times a day could not be made comfortable by turning her out once a day and putting eighty or ninety pounds of ice water into her stomach. Did you ever see a cow try to warm five pails of cold water? They stand up with rounded backs and commence a sort of roll backwards and forwards with shiver accompaniment, and then men say: "See her shivering. She is tender. That breed of cows never were hardy." She was trying to do what her owner was not allowing her to do, drink a little warmer water and not shiver so much. The question is, how shall we water these cows? I have studied this matter of the watering of cows for years. I have tried all kinds of methods, put in patents and thrown out patents. At last we have got something of our own that suits us well. Mr. Gould then proceeded to explain this system. He told his hearers to imagine that the orchestra pit in front of the platform was the manger of the cows. Then the footlight arrangement would represent a water box put into the inside of the manger at the top thirty-two inches from the floor and nine inches deep. At the end was a great big tank. "Here comes in another question," continued Mr. Gould, whether in our warm stables that never freeze we can keep water warm enough without the extra danger and expense of putting a fire into the barns. All heaters are fire boxes, and all are liable to burn up the barn. At this end of my stable, standing just above the water trough, is a galvanized iron tank that holds fifty barrels, set up on a stout platform, fitted with an iron cover, connected with a well and windmill. We keep that tank full by pumping a little water in every day. Here this water stands at a temperature of fifty degrees. Then we fill up the trough with water, and our cows drink water at exactly the same temperature as that in which they stand. We find that method answers every purpose of heating the water. We simply ask the cows in our day to warm their own drinking water. This tank and pipe and all, cost, for each individual cow, about $2 to put in. The objection to the long continuous trough from which all drink is met by putting an inch iron pipe in the bottom of this trough in which a hole is drilled in front of each cow, with tank hose coupled to this pipe, and the water runs the length of the stable in this pipe in the trough, and so the water for each cow is a direct offering to her. The cow then drinks when she wants to.

When the cows are feeding we cover up the water box, and afterwards we lift the lid and fill them up. That settles the question of how much a cow drinks and how often she drinks. She drinks when she wants to, and as often as she wants to. One question more. I don't want the cows out in the winter at all. I put them right to their "knitting work" to make me milk. With a stable, light and warm, dry and plenty of water, we believe these cows are doing fairly well, because some of them started in giving 4,500 pounds of milk and are now bothering me with 6,000 and 7,000 pounds of milk. I am not afraid they are going to die sometime from lack of exercise, but to me it is a very profitable lack of exercise. Here is a cow at work, and she is getting her exercise by giving me milk—muscle power, nerve force, turned into milk—and I want them. You say the cows wear out sooner. Hadn't the cow better wear out in six years giving 6,000 pounds of milk a year rather than in twelve years giving 3,000 pounds a year? Now comes the feed of this cow. We have been told at this convention over and over again that we have got to economize somewhere. I say the same thing, but I don't mean living on less, or wearing less clothes. I mean economy, by getting more food per acre on our farms and of the character that we want and turning it to a more profitable account. To-day the problem confronts us that never confronted us before, "What are we feeding our cow for?" We feed her to keep her alive. Yes, we feed her to make milk. Yes. But did you ever think that out of four or five pounds that you feed the cow only one pound goes to make milk? What is that four pounds for? It is to make fuel and nothing else. You say you don't understand why this cow should want anything to keep up animal heat in the summer. I believe you! But did you ever take the temperature of a dead cow in June? Isn't she a pretty cold piece of cow beef, even on a hot summer day? That four pounds of feed in the summer goes to make up heat just as it does in the winter. There is no feed that we are feeding to day that is so expensive and that we get so little out of in proportion to its cost as meadow hay. It is almost entirely used for keeping up animal heat, and yet we are feeding fuel to this cow which costs us, say $10 a ton. We raise it ourselves; throw her another fork full. Did you ever consider that that is not economy? We shall get about a ton of timothy hay from an acre. I don't believe the Canadian farmer raises much more than we do, and we tell our assessor that we raise one ton to the acre, and I don't believe anyone tells fibs to the assessor. (Laughter.) Let us see what this ton of timothy hay contains. In the first place it contains twenty-six per cent. of what we call fibre, that is of no earthly use whatever. It is just simply filling—not satisfying, but filling. Nine per cent. is nitrogen, flesh former, muscle former and forty-eight per cent. starch fuel. And so if we figure the whole thing up we find that we get about twelve hundred pounds of fuel flesh formers out of an acre of timothy or fine meadow hay. Over the fence your neighbor this year raises a nice piece of corn—eighty bushels to the acre. There are twenty-eight hundred pounds of ears of corn, and seventy-eight per cent. is starch, a small per cent. is fibre, and all the rest is digestible. The stalks on which this corn grows has just as much feed value, just as much starch in it. We put the two together, and you have fifty-two hundred pounds of fuel out of this acre of corn, of which probably seventy-five per cent. is digestible. Can you afford to grow hay, when on an acre of corn you have five thousand pounds of feed value to burn in this cow's system to make animal heat, and on the other acre you have only a little over twelve hundred pounds of fuel. The cow says: "I don't care where I get my starch from, provided I get it rich and palatable." And so she eats the corn fodder when it is green and succulent, and does not readily eat it when it is not green. But you say, "I want to keep my meadow." Well, keep them and sell the hay. Here comes in another question right alongside of this. What shall we feed with this feed? We have got all the fuel we want. Now we want something else to make rich, red blood. Something to give muscle, and strength, and power of locomotion. Then we come down to something that is represented by the nitrogenous food. Here comes in another class of foods, our oats, our buckwheat, our bran, and our shorts, and our oil meal, and our cottonseed meal. Now, while we have to provide five pounds of fuel, we only want one pound of the rest to balance up this ration to give us the strength and muscle and nerve that this cow needs. It is a question of raising some peas and some oats, and exchanging the oats for mill

feed, because I say that a cow will not get along so well on oats as she will on mill feed. She never gets tired of mill feed. We can supplement this with peas. Over in New York state, where buckwheat is only twenty cents a bushel just at this time, they are having it ground, taking out the best of the flour for the family and letting the cow have the middlings, and they find that it is very nitrogenous—almost equal to bran and one of the cheapest feeds. During the last two or three years I have been trying by a series of experiments to bridge over the time between the corn soiling and the opening of the silos. There is a time, you know, in late October and November when green foods are hard to get, and dry feed will not keep up the flow of milk. Can we bridge this period? I have tried everything, and at last have settled down to this: We grow a crop of peas and oats and then we turn the cows into them for three or four hours each day, and the result is that the cows never show any difference between the green corn soiling and the silo.

A MEMBER: Did you sow the peas in August for the October and November feeding?

Mr. GOULD: The last week in August.

A MEMBER: What time did you turn the cows on?

Mr. GOULD: We turned the cows on immediately after the corn fodder had dried up after cutting. The corn fodder we had been cutting up had got so dry that the cows refused to eat it up clean, and hence was not very profitable. Continuing, Mr. Gould said: One thing more. We are believers in the silo. We have had two now for ten years, and we have had some little to say about them to the public and in the papers. (Smiles.) As soon as the cold weather sets in we open up the silos. We gradually keep the cows in nights more and more; when the weather changes we keep them in stormy days, and when the cold weather settles in we put the cows in the barns and we open the silos. This is usually about our Thanksgiving Day, and the cows stay until Easter Sunday. Then, if it is pleasant, my wife puts on her new bonnet and goes to church, and the cows are also turned out. If it is cold and stormy both stay in. (Great laughter.) Our ration for the cow during the winter is a very cheap one—ensilage, fifty pounds a day; straw, two pounds a day; hay, about two pounds; and we feed six pounds a day of grain, five pounds of wheat middlings, and one pound of oil meal. We sometimes change this, and in place of the oil meal put oatmeal. Then after a few days we go back to oil meal. I have never found yet that it pays me to feed a ration exceeding six pounds of mixed feed a day to the average cow. What are the cows making? I am getting ninety cents a hundred for milk at the stable door this winter. My cows are giving me thirty pounds of milk daily—that is twenty-seven cents. Out of this I take eight and a half cents for the cow's rations. Is this profitable winter dairying? It is a question of taking care of my cows. Cheaper and better rations are the questions that we have to meet. It is not a question that we can put off until to-morrow. The solution of it must be entered upon to-day. And so along this line I believe the solution of this question is better care of the cows, and better cows, and making the dairy more continuous. I do not say that every factory should make butter and cheese together. I believe it is a detriment to the industry, but I do believe it is possible to make cheese in the summer and butter in the winter

A MEMBER: How often do you feed each day?

Mr. GOULD: I feed twice a day all the cows will eat and eat up clean, and then we give them the balance of the day to ruminate and have a good time generally. But some one says to me, "You eat three times a day." Yes, but I have only got one stomach and the cow has got four. The cow wants time to ruminate and digest the food. My food is digested at once. Her food does not digest until the second time it is eaten—which is cud chewing. But, anyway, I do not know whether I would not be better off on two meals a day myself and save a meal. I don't know that I have anything more to offer on this question. I only want to say standing here to night, my last appearance before I go away, that I can assure you I fully appreciate the hearty welcome which you Canadians have given me. I was told before I left home that I would be captured and held prisoner of war if I went to Canada. I told the boys in reply that you level-headed Canadians, unlike them, didn't go off at half cock every time they heard a duck gun in a Virginia swamp. I am glad I came to Canada, and shall come again, war or no

war, if I can get across the lines, and it will only need an invitation for me to make the attempt. Wishing you all prosperity and never-changing friendship, I salute you with heart-felt appreciation and my best bow.

SOME PRACTICAL EXPERIENCE.

The PRESIDENT then asked Mr. E. D. TILLSON, of Tilsonburg, to speak a few words, introducing him as one of the remarkable men of Western Ontario, a man highly respected where he lives and where he is known, and a man closely identified with agriculture, as with a great many other matters.

Mr. TILLSON, after remarking that the call from the President was totally unexpected, said he did not altogether agree with Mr. Gould in regard to a basement stable. He thought he had one of the finest stables in the country, and it was a basement. Mr. Gould had said they were damp and cold, but his was warm and dry. It was quite light, because he had windows all around it.

Mr. GOULD: A basement barn in our country is a bank barn right in the ground.

Mr. TILLSON, continuing, said he thought his system of watering was far ahead of that of Mr. Gould. His was so arranged that each cow had fresh water. Mr. Gould had a long trough, the water ran the whole length, and the cow at one end had to drink the water that had passed all the other cows. He approved of raising and feeding corn. He had gone into it very extensively. He found that corn ensilage was the cheapest feed that he could grow. He fed it both in summer and winter. He thought it was the most convenient and cheapest food that one could have in the summer. He fed ensilage and clover hay. He thought clover was far ahead of timothy. Since he had been trying in practice what he had read and heard, he had improved his cows. He kept a record of the milk. He weighed the milk from each cow, and registered it in a book, so that he knew just what every cow was giving him. Then he tested the milk by the Babcock tester to know just the quality in order that at the end of the year he might know just what every cow had done. He raised all his heifers, and kept weeding out the poor ones and breeding the best ones. He had by so doing improved the cows. A year ago last spring he had ten two year old heifers come in at the same time. He milked these heifers just twelve months, and in that time they gave 10,480 pounds of milk each. One of those heifers had now come in again, and she was giving sixty-three pounds a day right along. The average of the strippers, those which were drying off, was twenty-five pounds a day—7,500 pounds a year. The quality of the milk was 3.75 per cent. of fat. He believed in keeping the cows in through the winter. He did not turn them out at all except on nice, warm days, when he let them have a few hours' exercise. In regard to corn growing, although ours was not a corn country like that where Mr. Gould came from, yet his crop had been away ahead of Mr. Gould's. He had fifty acres last year that produced just twenty tons to the acre—1,000 tons which he put in the silos. This corn was well eared. He had weighed the corn and measured the acres just so that they might know where they stood, and it cost him just sixty cents an acre to grow the corn and forty cents an acre to put it in the silo. It just cost him $1 per ton to grow the corn and put it in the silo. This winter, not having any hay, he had fed very heavy of ensilage. He fed sixty pounds of ensilage, but had he had plenty of hay he would only have fed forty or fifty pounds of ensilage. Next summer he intended to keep his cows in most of the time. The flies and the drouth were so bad that his cows last summer gave less milk than in the winter.

The PRESIDENT: I do not believe there is a farmer in this western district but who, if he were to visit Mr. Tillson's farm, would learn something. He is presenting an object lesson to the farmers of the country, because you can get without expense the results of his experiments with large means. He is doing good along the same lines as the Government is doing when it establishes model farms. For that reason I am sure you are very glad to hear even in a very brief way the results of some of his experiments.

FINE FOOD PRODUCTS IN ONTARIO.

Prof. ROBERTSON said: I am to speak of the resources of this Province for fine foods. The more I learn from frequent travelling of the almost unlimited resources of the Dominion for profitable agriculture, the more admiration I have for the Province of Ontario. Sometimes the people of Ontario have a little inclination towards a tendency to suppose, or to have it said that they do suppose, that if a man speaks very well of the fruit-producing resources of British Columbia, that therefore he has less liking than before for the fruits of Ontario. But only a man who knows Canada from ocean to ocean can appreciate Ontario at its best and true worth. And so, while I have something to do with all the provinces of Canada, I come back every year to the Province of Ontario with no abatement of my admiration for the resources of this beautiful Province. Still, of all the good things Ontario possesses, I do not know of anything that cannot be made better than it now is by the intelligence and the industry and the skill and the patience and the justice of men and women, and just so far as this Western Dairymen's Association can stimulate the presence of these things, so far does it become one of Ontario's valuable resources for wealth. There is an opinion sometimes that the sources of wealth are all material things that can be weighed and measured and bought and sold. It is not quite so. While the natural resources for wealth may be spoken of as soil, water, climate, and building materials, these cannot be realized upon into forms of usable wealth except by the application of intelligent labor. In so far as this Association causes the people of the Province to exert themselves in right directions, in so far does it enable them to make the resources of the Province available for the well-being of the people. As sunshine acts upon the latent life of seeds which are planted, and wakes them up into the doing of something, so the kindly energies of this Association have been waking up the farmers throughout the Province and causing them to bring things to pass. As inert material is quickened and glorified through the contact of the life of the plant and the application of sunshine, so the great masses of the population are wakened up and lifted up by the humanized sunshine which finds expression through such organizations and conventions as this. Of course, some few people see no good in these things. They are those who never go into the sunshine business; and the sufficient answer to their unbelief is that the presence of a blind man does not abolish the beauty of flowers, nor prevent the sweet sunshine from enriching the earth with these and many other good things. In considering the natural resources of Ontario, the first impression and conclusion is that the soil is generally a fertile one. A fertile soil does not always carry rich people. The delta of Egypt, which probably contains the richest soil in the world, is tilled by the poor fellahs, who have not risen above the lowest estate during half a century of centuries. Their labor has been of a low order, and to intelligent "labor the gods give all good things," including the choicest products of soil with the largest profits from them.

In Ontario, the live-stock interests are inseparably interwoven with the methods of agriculture by which farmers can make a good living. Their prosperity is dependent upon the measure of success with which they rear, feed, and market animals and their products. By that course only can the fertility of soil be maintained, with a rotation of crops and profitable employment for farm hands during the twelve months of the year. By growing such forage crops as are adapted to the soil and climate, it is possible to obtain large yields of nutrients per acre. The following chart shows the nutrients obtained per acre from five different crops:

	Albuminoids.	Carbohydrates.	Fats.
	lbs.	lbs.	lbs.
Indian corn, 9,000 lbs. dry matter	873	7,371	288
Horse beans, 12 tons	653	1,814	167
Sunflower heads, 7½ tons	352	2,373	729
Hay, mixed, 2 tons	271	2,888	97
Roots, carrots, or mangels, 20 tons	480	4,230	68

The fine food products from these would be more than sufficient to sustain one person per acre. The food producing resources of Ontario would not be taxed beyond what they would give in response to good culture if a population of twenty million of people, instead of two millions, was to be fed. As the ultimate object of all farming is to provide food for the people, the larger the quantity of the valuable constituents of food which are obtained per acre, the more chance is there for the farmer to make good profits from his business. In the competitions between foods for preference in the market, the fittest in regard to nutritive qualities, pleasant flavor, and low cost of production will doubtless survive and succeed. One pound of cheese contains about as much nourishing material as two and a quarter pounds of beef. In order that Canadian products might obtain a preference in the markets to which they go, it is necessary that they should be wholesome, nourishing, nice in taste and appearance, and, if they go to Great Britain, of reputed respectability as to origin and name. An English family would hardly offer an honored guest a roast from Australian frozen beef under its own name; but they might be willing to let the retail butcher charge them six cents per pound more for the same article if he did call it "best Scotch," or "best English." In brief, the sentiment for reputed respectability in name of even a roast of beef makes the English willing to pay the retail butcher at the rate of from four to eight cents per pound for politely misrepresenting the facts to them. The consumption of fine food products, such as can be produced in abundance in Ontario, is very large per head of the population in Great Britain. It is put at one hundred and thirty-five pounds of beef, fifteen pounds of butter, and thirteen and a half pounds of cheese. Of these quantities, thirty-eight pounds of beef, nine and a half pounds of butter, and five and a half pounds of cheese per head of the population are imported. The value of the imports into Great Britain in 1894 of living animals for food, dressed meats, butter, cheese, poultry, eggs, and such fruits as Canada could supply, was over $280,000,000. It should be our policy to beguile the consumers and merchants there to depend upon us for a large share of what they need of these things. In order to do so, improvements must be made in our methods and means for preserving the perishable food products while in transit from the place of production to the consumer. It is necessary that they should reach the consumers in their very best condition. In the case of butter, it is most desirable that it should be put into a cold place at a temperature not higher than thirty degrees Fahrenheit within two days after it is made. After cheese are cured, they also should be put in a cool place. Experimental shipments during the past summer demonstrated the great advantage which would result to the cheese trade if cold storage accommodation on board the steamships was provided for all cheese to be exported during the months of July, August and September. The cold storage service on the steamships for butter during the summer was very satisfactory, but it may be further improved. In order that cattle and meat products of Ontario might reach the consumers in better condition, it is necessary that some radical changes should be made in the methods of transportation and distribution of them to the consumers.

Last year a new competitor appeared in the British markets in the form of one shipment of cattle from Australia. However, it is not likely that the experiment will be repeated, as the cost for freight, insurance, fodder, etc., amounted to $68 per head; the cost for these for sheep came to $6 per head. The freight charges on live cattle from Canada to Great Britain, while not too high for the space occupied on board the steamships, has been much higher than the necessary expenses of carrying the dressed meats from the same animals to the same ultimate destination. When sent forward in the best condition, the hindquarters of beef were selling, during last summer, for the six months ending 31st August, at from $10.50 to $13.50 per 100 pounds. The whole carcases were selling at from $9 to $11.50 per hundred pounds. The expenses necessary for transportation of the chilled meats in cold storage from Ontario to the same markets where these prices were being paid need not, and would not, exceed two cents per pound. That would permit prices at least from $7 to $9.50 per 100 pounds to be obtainable here, instead of the prices which are current at the present time. There is a great difference in the value in Great Britain between chilled beef, such as can be sent from Canada, and frozen beef. The latter does not fetch much more than one-half of the price per 100

pounds of the former. There has been a decided falling off in the shipments of cattle from Ontario during the past few years. The shipments from Canada were nearly 20,000 head less in 1895 than in 1890; and in the shipments of 1895 were included some 40,000 head from Manitoba and the North-West Territories, from which places in 1890 the exports were very small. If we get dressed meats to the consumers in their best condition under the name "Canadian" well established, a permanent trade connection between the consumers and the producers will be created, and thus the latter will be enabled to get their rightful share of what the consumers pay for their products. A plan for the opening up of a dressed meats trade is to be submitted to Parliament. If it is accepted and acted upon, arrangements will be made for the sale of Canadian chilled meats, under their own name, in depots in many of the large cities in Great Britain. The plan will provide for the Government opening up the business for one year only, and the commercial agencies in Great Britain will be so chosen and managed that men of capital and knowledge of the business there will continue the trade in dressed meats from Canada afterwards on their own account. After the first year it will be necessary for the Government to appoint inspectors of meats, in order that the meats at any of the abbatoirs in Canada for export may be graded according to the standards established during the current year under the arrangements made by the Government. That will enable the buyers in Great Britain to purchase Canadian meats of certain recognized standards of quality, as they now purchase Canadian cheese and butter. That will stop the undesirable practice of consigning our perishable food products, which at present is the case with cattle and sheep. While this is a new act on the part of the Canadian Government, the manner according to which the business will be administered is not new in Governmental affairs. In 1886 cheese and butter were purchased by the Government of the Province of Ontario and sold in small packages at the Colonial and Indian Exhibition to advertise the excellence of Canadian cheese and butter there. Work of a somewhat similar kind has been undertaken by the Dominion Government in establishing dairy stations and managing the financial part of the business for the farmers until the channels were opened up and the farmers had acquired sufficient knowledge to carry on the business successfully themselves. Similar work was done by the Imperial Government of Great Britain in India to establish and develop the tea trade there, which is now of great importance to the prosperity of that empire. In that case the Imperial Government purchased the small farms, procured the plants, hired the men who grew the tea, and marketed the same, until they had demonstrated the feasibility and profitableness of that branch of culture. With the opening up of a trade in dressed meats, such as beef, mutton, pork and poultry, something could be done in the way of improving the marketing facilities for collecting and marketing Canadian eggs and fruits. Doubtless with this major industry would grow up such minor and associated industries as the rendering of tallow, the tanning of hides, and the making of glue and fertilizers. These seem to be the means and ways whereby and wherein at the present time it is most desirable that the Government should lend its powerful assistance for the development of the resources of the Province of Ontario in dairying. Other provinces would reap an equal share of benefit from such action.

The convention adjourned to meet on Thursday morning.

THIRD DAY—MORNING SESSION.

Despite the fact that a large number of the delegates to the convention were unable to remain to the sessions of the last day, the meetings both in the morning and afternoon were unusually large, and the interest displayed by those in attendance exceptionally great.

Mr. A. T. Bell took the chair at the morning session, and introduced the first number on the programme.

MISTAKES IN CHEESE MAKING AND HOW TO AVOID THEM.

Mr. T. B. MILLAR then read the following paper:

I have been asked to bring before this meeting some of the mistakes made in cheese making that have come under my notice during the past season, and to suggest how they might be remedied. I shall do so as briefly and clearly as possible.

Milk. A mistake that is made by a great many cheese makers is accepting milk that is quite unfit for making fine cheese. By doing so, a number of makers have hurt their own reputation and that of the factory under their charge. Several such instances came under my notice during the past season. I visited a number of factories where the cheese had been rejected on account of flavor, and after a thorough investigation I found that the maker, in almost every case, was accepting milk which, although quite sweet, had such a bad flavor that it was impossible to make a first-class article of cheese from it.

In a case of this kind I would advise the maker, or if he cannot, then one of the directors, to go and see the patron and find out wherein the trouble lies, and suggest some way of removing the evil. As a rule if this is done the trouble ends there, on the other hand, if it is neglected, the chances are that their cheese will be rejected the following sale on account of the objectionable flavor.

The best results from cheese making are attained only when made from a good quality of milk. Then it behooves every cheese maker to try to educate his patrons to furnish milk in first-class condition, and unless they do so they are a detriment to the factory as as well as to the industry at large.

Ripening. Maturing the milk too much before setting is a very common mistake. Very often I find makers dipping their curd with half an inch of acid before it has had time to cook, quite often dipping in less than two hours from the time it was set, whereas it should remain in the vat two and one-half or three hours. The result is that they have a soft mushy curd that requires a great deal of stirring in the sink, and which will make a harsh, coarse-grained cheese, lacking that silky texture so very desirable in all cheese. Set the milk early enough to give time to have the whey expelled and the curd properly cooked before the development of acid takes place.

Starter. Regarding the use of a starter there is a difference of opinion. While I know that a small quantity may be used to advantage in many cases, yet a number of makers make a mistake by using too much and setting the milk at about the same stage of maturity as when not using it, so that the curd develops acid quickly in the whey, and after dipping lies in the sink for hours before it is matured enough for salting. Cheese so made has a flat or dull appearance and does not seem to have any life in it.

In using a starter always set the milk at an earlier stage than if you were setting without one, and be sure that the starter is of a clean flavor, otherwise it will taint all the milk in the factory. There is an ingredient that should always be used with a starter, but which is often overlooked, and that is good judgment on the part of the maker. I would advise a small quantity of starter with a larger portion of judgment. In this way good results may be obtained.

Rennet. In the use of rennet a great many mistakes are made, some not using enough, others using far too much. I find the quantities used varying from one and one-half to four ounces of rennet per 1,000 pounds of milk. With the first amount the cheese were stiff and slow curing, with the last the cheese were ripe in two weeks, and as a matter of course were "off flavor" long before they were shipped. It is not a safe plan to go by any fixed quantity at all times, as a great deal depends on the strength. Enough should be used to cause perfect coagulation fit for cutting in from thirty to thirty-five minutes. As a general rule this requires about two and one-half ounces of Hansen's extract per 1,000 pounds of milk at a temperature of 86°.

Cutting. When the curd is ready for cutting do not make the mistake that some do, of rushing the horizontal knife quickly through the curd, causing a wave to form in front of the knife and breaking the curd instead of cutting it. Commence cutting early and take plenty of time to do it right.

Cooking. After the cutting is completed, stir the curd carefully by hand for ten or fifteen minutes before any steam is applied. Heat slowly at first, and continue stirring by hand until the curd becomes firm, then a rake may be used to advantage. A mistake here is often made by putting the rake into the curd immediately after cutting, and using it in such way as to break the curd, causing a loss both in quantity and quality.

Acid in Whey. The amount of acid used for dipping varies very much, from one-eighth to one-half and sometimes three-fourths of an inch. It is a mistake to develop one-half inch of acid in the whey before dipping; one-quarter of an inch is quite enough for any curd, especially in the case of a bad-flavored one, which should be got out early, for the longer it remains in the whey the more decided the flavor. With a curd of this kind better results may be obtained by raising the temperature two degrees just before dipping and keeping it warm in the sink until ready for milling; then air and mature well before salting.

In the Sink. Turn the curd every ten or fifteen minutes, or often enough to keep the whey from gathering in pools on the curd, and when piling leave a space of an inch or more between each tier to allow the whey to escape.

Milling. Mill or grind the curd early and thus save butter fat as well as improve the flavor and texture, or body of the cheese.

Airing. In the warm weather, after milling, if the curd is maturing nicely, leave off the cover and turn the curd every few minutes, exposing fresh particles to the air. Doors and windows may also be left open.

Salting. Use some brand of pure dairy salt, and also practice judgment in using it. Do not make the mistake of using three pounds of salt per 1,000 pounds of milk on a dry curd, or two and one-half pounds on a moist one. I tried some cheese at the Western Fair last September, which were spoiled simply by over-salting. As a rule from two and one-half to two and three-fourths or three pounds of salt may be used per 1,000 pounds of milk, but the amount of moisture in the curd must always be taken into consideration.

Putting to Press. Do not put the curd to press too warm. Cheese put to press at 90° will cure and go "off flavor" much quicker than if the same had been put to press at 80° or even lower. Try to get your cheese of a uniform size, clean and well-finished, and on no account allow a cheese to be taken into the curing room with those unsightly ends which may be seen in a number of curing rooms and which are always a matter of great annoyance and loss to a buyer.

Curing. In the curing room leave the end or cap cloths on the cheese for two or three weeks, or better, until the cheese are to be shipped. Be watchful to see that there are no cracks in the end of the cheese, and keep a little *clean* whey butter with which to fill them up in case any should appear. In the hot weather strive to regulate the temperature in the room as far as possible, airing it well every evening as soon as the temperature outside is lower than that of the curing room. In the spring and fall, by paying attention to the fire, maintain a regular temperature of from 60° to 65° or as high as 70° if a quick-curing cheese is desired. A great many well-made cheese are spoiled by neglect in the curing room. I have been in curing rooms in the spring and fall where the temperature was down almost to freezing point, and not a spark of fire in the room, the fresh cheese being placed on the shelves, where, instead of curing, they were simply becoming pasty and unsaleable.

Mr. Bell: I hope we will have a good, lively discussion. There have been a great many valuable points made by Mr. Millar. The inspector is quite capable of answering any questions that may be put to him regarding his paper.

Mr. WHITE: If you had a perfect curd, and everything seemingly right, what temperature would you recommend before going to press?

Mr. MILLAR: I prefer a temperature about eighty degrees. In the hot summer days my advice is to air your curd well, and get it as cool as possible before going to press. In the spring or fall a temperature of about eighty degrees is very suitable. We have had excellent results from lower temperatures.

Mr. WHITE: What do you think about letting the curd lie after the salt is melted, everything being right, before going to press?

Mr. MILLAR: As soon as the salt is dissolved properly I would put it to press.

A MEMBER: In a cold room would you advocate putting to press about ninety degrees, or would you adhere to eighty degrees?

Mr. MILLAR I would not put to press above eighty degrees. I would keep a fire in the press-room, if possible, and use lots of hot water on the hoops during the cold weather.

A MEMBER: What is your experience with the hot iron test? After the curd is ground, would you advise us to go by the hot iron test?

Mr. MILLAR: No. I would not depend upon the hot iron test after the curd has been milled. I think it is a good thing to use the hot iron before grinding. I have milled lots of curds with less than three-quarters of an inch of acid when they were working fast. You get rid of the sour whey flavor, and you have much nicer cheese. If the air is perfectly pure I think it would be an advantage to have the room well aired after the curds are milled. The day of keeping the making-rooms closed up has gone by. I would say open the windows and doors, and have the room well aired after the curds are maturing nicely.

A MEMBER: Do you approve of washing gassy curds?

Mr. MILLAR: I have not had much experience with washing. If you are washing them, wash immediately after dipping for a fast working curd or a very bad flavored one. If you leave it till after milling you wash out a good deal of the fatty substance.

A MEMBER: My experience in that has been that I have had better results in washing curds after they were milled—just directly after they were milled.

Mr. MILLAR: My experience has been the other way. I prefer washing immediately after dipping. I would like to hear some other maker's opinion upon that.

A MEMBER: What temperature would you have the water for washing your curd?

Mr. MILLAR: At the time of dipping about the same temperature as the curd—ninety-eight degrees to one hundred degrees.

A MEMBER: In washing the curd immediately after dipping, is it not rather difficult to keep it fine enough—loose enough?

Mr. MILLAR: I do not think so. If you use the water too hot, of course, it will run together, but if the water is about the same temperature as the curd it is all right.

Mr. BRYAN: My experience always was that washing a curd with water seemed to make a weak cheese. I have not had good results

Mr. MILLAR: My own opinion is that it is better not to wash them if you can get along without doing so. In my own work I do not wash a curd at all. I try some other plan of handling it. Where I get a really bad flavor I draw the whey early—draw it down close to the curd, and then, just before it is ready to dip, I run up the temperature two or three degrees. Then I mill it early, and air and mature afterwards.

A MEMBER: I have had curds that before they were heated up were ready to run off.

Mr. MILLAR: Well, run them off as quickly as possible. I would not wash them; I would stir and air them well.

Mr. WHITE: As to the weak cheese referred to by Mr. Bryan, I think that if the right kinds of salt, acid and rennets are used, you will not have weak cheese. That is my experience.

Mr. BUTCHERT: The drift of the discussion seems to be how to make good cheese out of bad milk. Gassy curds, quick working curds and all these things are the result of bad milk. There is no man living who can make good cheese out of bad milk. As a cheese-maker I know you cannot make perfect cheese out of imperfect milk, and as a farmer I know there is no reason why poor milk should go to the cheese factory. I have been sending milk to the factory for four years now, and I make a practice of keeping home my Saturday night's milk. I used to make cheese on Saturday nights, but I did not like it, and since I have quit making cheese I do not send my Saturday night's milk to the factory till Monday. When it is milked Saturday night I take it to the trough and cool it, and put it down in the cellar. I do the same with Sunday night's. Then on Monday morning I cool the milk of that morning, and I put all the milk together and send it to the the cheese factory in good condition. Now, if I can do that, there is no reason why everybody else cannot do the same thing. If the milk is proderly cooled it will never go to the factory in poor condition, provided the cows have not been drinking bad water. The chief cause of tainted milk is tainted water. I have seen milk in the early spring which had the smell of the cow manure. You will probably have noticed that when the cows are out on a spring day they will gather around the manure piles and drink the water that stands there. You let the cow drink that water, it passes through her udder (and it doesn't get any cleaner in that process), and then you send it to the cheese-maker and ask him to make good, perfect cheese out of it. He cannot do it; he can not make good cheese out of it, let him try never so hard. The cheese-makers, to my mind, have got to that point where they can not improve the cheese very much without our help. If we will provide good, wholesome food for the cows, and good, wholesome water, I will guarantee the milk will be all right when it comes from the cow. The cow is always honest; she gives just as she gets. She will give good, wholesome milk if you provide good, wholesome food and water. Then, if you will take that milk and cool it down to 60°, and as long as it is in your care keep it at that temperature, it will go to the factory in good condition, and the cheese-maker can make good cheese. He will not then have to consider whether he has to wash that curd. The price of cheese has something to do with the quality, although not very much. It seems all to get about the same price whether it be good or bad cheese, but the day is coming when the quality will have more to do with the price.

A member asked whether Mr. Butchert did not find that the cellar tainted his milk, to which that gentleman replied that he never had any trouble because his cellar was dry and clean.

Mr. BLANEY: Do bad water and bad feed cause gassy curds entirely?

Mr. BUTCHERT: There may be other circumstances, but bad water and bad feed are the principal causes. Of course something may come in contact with the milk after it is drawn from the cow.

Mr. PAYNE: I heartily endorse what Mr. Butchert has said in reference to cheese-making. We know that when cheese are sent to exhibitions such as the World's Fair, where the judging is done by the scoring system, about fifty per cent. of the value of the cheese is based upon the flavor. I think the flavor is one of the most essential points of a cheese. Let the cheese be good in every other particular, yet lacking in flavor, and it is a poor cheese when we put it into our mouths, which is the ultimate end of all cheese. I think Mr. Butchert's arguments are good. I like the point he made that we should avoid taking in milk that is not in the right condition. I think as long as we cheese-makers continue to take in milk that is not right in flavor and other qualities we cannot be expected to make good cheese. The longer we continue to do that the longer we may have to do it. If we give the patrons to understand that we cannot get first-class results out of second-class milk they will be less apt to send us poor milk. I have had sixteen years' experience in cheese-making and my opinion is that it is best to reject this milk.

ever time, or almost every time. It is better to run no risk—to keep away from the dangers as far as possible. By passing all the milk under his nose a man becomes acquainted with the smell and can easily detect the poor milk.

A MEMBER: I think a great mistake is made in putting milk in the cellars. It is a well known fact that most of the cellars in this country are constructed with no pretense of ventilation or of light, and the milk stored in them is tainted by a close odor. The same remark applies to many of our stables. We go into the stables that were constructed eight or ten years ago, and we find that little attention was paid either to light or ventilation. Enter them at this time of the year, or in the summer when the cattle are in for milking, and you will notice these confined odors there from the cattle. We find the cows breathing the same air over and over again until it becomes perfectly foul with that animal odor. I am glad that in constructing cellars and barns during the last year or two great attention has been paid to light and ventilation. I know barns where the ventilators are open through the coldest weather, and they tell me it is plenty warm enough for the cattle and there is not the slightest trace of that close odor.

Mr. BUTCHERT: Every cheese-maker who has been any length of time in the business has seen when he poured the milk out of the can a lot of settlings at the bottom of the can, and sometimes there was something in the milk that would not settle, but would float. If he would smell that he would find it to be cow dung. You may as well call it that at once. Who put it there? It was either the cow or the man. The cow put her foot in the pail or the man pulled the stuff off the cow somehow. I have seen other cans of milk at the factory that were just as clean at the bottom as they were at the top. There was not a particle of settlings in the can at all. There is no need for settlings in the milk; there is no need for that cowy odor at all. If the man will take a cloth and rub the cow's flanks and udder sometimes and milk carefully he will have just as clean milk as possible. There need be nothing in the milk that ought to be strained out of it. When you get the milk out of the cow's udder there is nothing you can strain out. If there are any odors in it you cannot strain them out.

A MEMBER: You never find bad flavors in clean milk; they are always found in milk when there is a sediment.

Mr. BUTCHERT: The only flavor you would find in clean milk would be a little sour flavor.

A MEMBER: Will you impress on the farmers how much more difficult it is to make good milk into cheese than bad milk. It takes thirteen pounds of poor milk and eleven of good milk.

Mr. BUTCHERT: That is where the greatest loss is in the year. You have heard about washing curds and grinding afterwards. All this means unnecessary work and consequently expense. If the patrons just knew that there was no gain with tainted milk all the way through I think they would be more careful. I know there is a loss, and I don't like to share the loss with other farmers, and I know that I am sharing. I know that the milk that I am sending to the factory takes but a trifle over ten pounds to make a pound of cheese, whereas some sent by the other men takes twelve or thirteen pounds.

A MEMBER: Did you ever weigh the curd the same day, the one tainted and the other not.

Mr. BUTCHERT: Yes, and I found a great difference. That all comes out of the farmer's pocket; the buyer does not lose anything by it.

A MEMBER: What days of the week does the poorest milk go to the factory?

Mr. BUTCHERT: About Tuesday and Wednesday. We had the poorest yields on those days.

A MEMBER: I suppose we can assume that every farmer takes a portion of the cream off the milk every day?

Mr. BUTCHERT: I do not. I am a farmer myself, and I do not take it off, so I do not "assume" it. There are certain people who dabble a little with taking the cream off. Mr. Millar will confirm that. The Babcock tester does not make people honest. I have heard it said on the platform that it will make people more honest. There has to be a greater power than that take hold of a man's heart before he can be made honest. The Babcock tester will make him afraid of his dishonesty—of being found out. There are people who make a practice of taking a little cream off the milk every day—not very much—and they do not deny it. A pint of cream will make pretty near a pound of cheese. Say a hundred patrons take off a quarter of a pint each every day, that is twenty-five pints, and it means a less yield at the factory of twenty-five pounds—one good cheese less every day.

Mr. BLANEY congratulated Mr. Butchert on his straightforward stand. He pointed out that where a farmer lived between two factories, almost as near to the one as the other, the cheese-maker was apt to close his eyes to the fact that the patron was taking cream off his milk for fear he should lose him altogether. A man had told him since he came to the convention that a man could not be successful in this world and at the same time be honest. He denied it, but he admitted the honest man had to be very far-sighted.

DAIRYING IN MANITOBA.

Mr. J. A. RUDDICK, of the Dairy School, Kingston, then made a short address on dairying in Manitoba, the North-west Territories and British Columbia. He said he did not intend to take up the time at that juncture with any lengthy discussion on dairying in that part of the world. He happened to have been out there the past two summers, and had seen a good deal of the country. He had been wherever dairying was carried on, and he would give a few figures to show the development of the industry in that part of Canada. The returns of the Manitoba Government showed that there were fifty-three cheese factories in that Province. This, however, included a number of small factories, really dairies where the milk of from one to two herds was made up together. The number of factories, as we know them, would probably be about forty. There were also nineteen creameries, fourteen of which were started last spring. These creameries, with the exception of three or four, were conducted on the cream-gathering system, that being found the most feasible in that country where the settlement was so sparce and the distances so great. Owing to these difficulties dairying would not be extended very much, for some time at least. In the North-west Territories there were nine cheese factories and ten creameries. They were principally situated in the Alberta district, near the line, between Calgary and Edmonton. This seemed to be a very favorable country for dairying, but stock-raising was the chief industry in that part of the great North-west. In case some of the dairymen in the Province of Ontario might be afraid of this great country up in the north-west going into the dairying business, he wanted to say that the fifty-three factories in Manitoba turned out last year only 1,555,192 pounds of cheese. He could point out about three factories within fifteen or twenty miles of Woodstock which would make as much as that in the same time. In British Columbia the conditions were very different to those in the North-west. He used often to hear it said in Ontario that the British Columbia market was not a very critical one—that they would take a poorer article of butter than people would take in other parts of the world. He wanted to say that there was no part of Canada where the people were more able or willing to pay high prices for the best article. There were two cheese factories and two creameries in that province. He was very glad to find that both the cheese-makers and the butter-makers were graduates of the Ontario Agricultural College Dairy School, and were doing excellent work, turning out good products. To those young men who might have a notion to go west he would say there was a good opening for a number of good cheese and butter-makers in Manitoba and the North-west during the coming season. Some difficulty was experienced last year in getting good men. He had made cheese in

many parts of the country, and he had never in any place found the milk work so nice and be so free from all the troubles of which they had heard that morning as in Manitoba and the North-west. This was due to the air being dry and the nights cool. If there were any who would like to make cheese there for a season he had no doubt that by corresponding with the Superintendent of Dairying, Agricultural Department, Winnipeg, situations would be found for them.

ADDING TWO PER CENT. TO THE FAT TEST.

Prof. DEAN said: I come before you this morning to discuss a very important question in connection with cheese-making, and the method of dividing the proceeds among the patrons of cheese factories. It is one that has been discussed frequently at your conventions. It was warmly debated at Stratford last year, and I find that there is a general interest in the subject wherever there are cheese factories. It is not my intention this morning to dogmatize, or to set up theories, but to give you, as far as possible, the results of our experimental work in connection with this question. It is all right for men to theorize about certain things, but it is only after practical demonstration that we get the facts before us. So far as time will permit I intend to bring before you facts in connection with experimental work at the Agricultural College on this particular important question. There have been a good many theories set up in regard to the points that I shall discuss. There has been some experimental work done in connection with it, and I wish to say right here that I recognize that good work has been done by Mr. Ruddick, who is here this morning, and by others. Mr. Bell has done some experimental work in connection with this question, and last year at your convention I endeavored to bring before you the results of their work in connection with our own. I need not refer to that this morning. I shall confine my remarks to our own work. There are four general stages in cheese-making. There is first the constituents as we find them, in the soil and in the air. These constituents are taken from the soil and air by plants through the agency of water and sunshine. The cheese that we have here before us (pointing to six cheese on the table) have come out of the soil and out of the air and from the water reservoirs of the country. We may generally speaking, say that all cheese comes from the soil and air. That belongs to another branch of the subject that it is not my intention to dwell on. The second stage in the process of cheese-making is that of feeding the plants, which came from the soil and air, to the cow, and the change of these plants by the cow into milk. That in itself is a wide field. The question of the profitable change of plants by the cow into milk has already been discussed at your convention. The third general stage is the change of the milk into cheese. That is the part that I wish to speak of this morning. The fourth general stage in cheese-making is the getting of cheese from the factory to the consumer or the marketing of it. That itself forms a wide field for investigation. I shall ask several questions this morning. My topic is a question, and before I get through I shall ask a good many more questions, and endeavor to answer them—some of them perhaps to your satisfaction, some of them not to my own satisfaction. The first question that I shall ask is: What is the composition of milk? I have before me some milk that I got on the street this morning. I think it is good milk. I have brought this in for a special purpose, which I will explain to you a minute later. To show you the results of chemical analysis of the milks that we have been carrying on in our experimental work, I will ask your attention very briefly to a chart We have been handling two classes of milk in our experimental work. We have been endeavoring to get milk with a high percentage of fat in it, and milk with a somewhat low percentage of fat, and to do this we have selected the cows in our own herd and other herds, which were giving a high percentage of fat, and the cows with a low percentage. We tested the cows every two weeks, putting the milk containing different percentages of fat by

itself. The rich milk we put in one vat and the low percentage milk in the other. The average composition of the milks containing a high percentage of fat as represented on this chart by the letter "H" is as follows: The average percentage of water in such milk was 87; the average percentage of fat, 4.1; the average percentage of casein was 2.5; the per cent. albumen, 8; average per cent. of sugar, ash, etc., 5.6—making a total of 100. This milk was carefully analyzed by our chemist at the College, and these are the results of the whole work for the past season. The milk with a low percentage of fat averaged as follows: water, 88.1; fat, 3.2; casein, 2.4; albumen, .7; sugar, etc., 5.6. You will notice that there are six chief substances in the milk. Now what part do these compounds play in the manufacture of cheese? We have been told that the fat represents the cheese-making value of the milk. Is that true? I propose to take that question up a little later on. I would direct your attention now to the part that these different compounds play. Can you make cheese without one of these? No, we cannot. Every one is necessary for good cheese. You cannot make good cheese without water in the milk. I mean the normal amount of water—not any extra. (Laughter.) We must have fat in the milk. We must have casein in the milk. We must have albumen, sugar and ash. Sugar is that part of the milk which has most to do with the fermentation. We talk about ripening milk, about ripening curds, what does that mean? Well, largely the change of the sugar of the milk into the acid, which we call lactic acid, There are other changes, but this is the principal one. Here is another point that I want to call special attention to: Why is it that we can sell our cheese in the English markets and in the Scotch markets for the prices that we are getting, leaving out the question of quality? Why can the English workingman, why can the Scotch workingman, buy cheese and eat them instead of meat? What is it in the cheese that enables the workingman to keep up his strength, to build up his muscles just as if he were to eat meat? We were told last night that one pound of cheese is equal to two and a quarter pounds of meat. Why? It is largely because of the casein that is in the cheese. If the workingman wants butter fat to keep himself warm he buys butter, but if he wants to build up his muscles, and a man who is working hard must eat something to build up his muscles, he takes cheese or lean meat or similar foods. What is there in the cheese that is not in the butter, except in small a quantity? It is the casein compound—the nitrogenous compound, or muscle forming compound, and therefore the most valuable compound in all food. I think that there is no man who has given any attention to this question who will deny that it is the muscle forming portion of the food that is the most expensive food that we buy. That is why the English workingman is able to work on cheese, whereas he cannot work on bread and butter. Why? Because the butter contains little or nothing of the casein or nitrogenous compound. I want you to remember that point. I raised the question a moment ago as to what part these compounds play in the manufacture of cheese. I have here a sample of milk and I have some rennet, and while I do not propose to make cheese I think I can illustrate it right here for the benefit of the city people who are perhaps not so well acquainted with the process of cheese-making. I take the substance called milk and I put in rennet, and that is one of the first steps in the process of cheese making. I have not measured the temperature, because I have not a thermometer here. In a very short time that should be thick. What effect did the adding of that rennet to the milk have? What parts of the milk does it act upon? It acts upon this compound called casein. It has little or nothing whatever to do with the other substances. Indirectly it acts upon the fat, but largely the effect of the rennet is on the casein. When we add the rennet we coagulate or curdle the casein of the milk, and then the casein takes the fat in its grasp and we get the curd, and after we go through the whole process of cheese-making we get cheese. The first step is the action of the rennet upon the casein, and we could not make cheese at all unless we had the casein present for the rennet to act upon. What influences are necessary in the making of good cheese? First and most important of all is the skill and good judgment of the cheese-maker. We have had that discussed here this morning. I was very glad that Mr. Millar raised that point in reference to makers using good judgment, because in

every step in the process of cheese-making a man requires that his judgment shall come into play. Then again we must have good milk. What do we understand by that? We want good flavor, a certain percentage of fat and casein, milk that has all the qualities of what we call good milk. Then we need certain agents, such as rennet and salt. These are necessary. Then we need good utensils and good factories. Just as an illustration of the importance of good skill and judgment in the manufacture of cheese I have two cheese here made out of the same milk. All the difference in these two cheese is that one was put to press at a temperature of sixty-six degrees and the other at eighty degrees. Mr. McLaren and Mr. Ballantyne scored the cheese, and they both pronounced the former to be the better cheese. Yet they were made out of the same milk. But one experiment does not prove very much. It is simply an indication that it is possible we may be able to make better cheese by cooling our curds more before putting them to press. I have over here a couple of other cheese. This one was milled with two inches of acid on the curd. Here is one with one and a quarter inches. Mr. McLaren pronounced the latter to be the better cheese. I would like him to give the reason why one cheese is better than the other. There was no difference in the milk. It was worked the same right up to the milling stage, yet the experts tell us there is quite a difference in these cheese. The next question I shall ask you is this: Is the yield of cheese in proportion to the volume or weight of the milk? Under the old system that we have been working on of paying according to the weight or volume we have said that the yield of cheese is the same from all kinds of milk—that a hundred pounds of one kind of milk will make just as much cheese as one hundred pounds of another kind of milk. I want to bring that before you in two ways. The first of these two cheese to be seen on the front of this table was made out of three hundred pounds of milk, which tested 5.0 per cent of fat. It weighed on taking it out of the press thirty-five and three-quarter pounds. This one when taken out weighed twenty-eight and a half pounds, or a difference of seven and a quarter pounds. Three hundred pounds of milk was used in both cases. Is it true that equal volumes, equal amounts, of milk make the same quantity of cheese? Both curds were handled much the same except in cooking and salting. The rich milk curd was cooked to 100 degrees, taking two hours to do this, and was salted three and one-half pounds per 100 pounds of curd.

I have on a chart here the results of our two years' work on the yields of the milk from different percentages of fat. I am not going to bother you with all these figures. I am going to point out just one or two things. In the month of April the average percentage of fat was 4.21 in one lot of milk and 3.39 in the other. There were eighteen hundred pounds of milk in each lot. The one made 192½ pounds of cured cheese, the other 166¼, a difference of twenty-six and one-quarter pounds of cheese.

You will see the whole way through what a difference there is in the yield of cheese from equal quantities of milk, the only difference being in the percentage of fat. So in answer to the question, Is the yield of cheese in proportion to the weight or volume of the milk? I say emphatically "No." If you have a variation in the percentage of fat in the milk delivered at cheese factories you have a variation in the quantity of cheese made. The next question I shall ask you is this: Is the yield of cheese in proportion to the fat of the milk? It has been told us that the fat of the milk is a correct measure of its value for cheesemaking. Now there are two questions that come in there. First, Is the yield of cheese in proportion to the fat? and second: Will the richer milk make a better quality of cheese? I am going to answer the first question. I call your attention to the chart again. With regard to the fat in the month of April, 1895, the average percentage of fat in the milk of one lot was 4.21, and in the other 3.39. The pounds of cheese from one pound of fat were 2.54 and 2.72. Now notice all the way down the column in any month that you like, there is not an exception to that rule—the yield of cheese per pound of fat in the milk is always greater from the lower percentage of fat in the milk, and the yield of cheese is not in proportion to the fat. I do not care who gets up and says otherwise; I am fully convinced after two years' experience that the yield of cheese is not in proportion to the butter-fat of milk in Ontario. It may be so in other places, but it is not so in Ontario. The poorer milk always gives a greater yield of cheese in proportion to the fat

contained therein. Why is that true? I am going to speak of that later on. The next question I wish to ask you is this, Is the yield of cheese in proportion to the fat and the casein of the milk? These are the two compounds which are most concerned in the manufacture of cheese. I said a while ago, when I added the rennet to the milk, that the rennet acted on the casein directly and incorporated the fat, and these are the two things chiefly concerned in the manufacture of cheese. Our chemist has found that the percentage of casein in the milk remains fairly constant. You will find by looking over this column, from milk having a high percentage of fat and a low percentage of fat, that the percentage of casein is very nearly alike; 2.5 is the average percentage of casein in milk having a comparatively high percentage of fat, and 2.4 when the percentage of fat was comparatively low. To my mind the right basis upon which to work in the paying of patrons of cheese factories is to recognize both the butter fat and the casein. I think so chiefly for two reasons; first because the casein is the compound in the milk and the cheese which furnishes the muscle for the working man to work with, and second because the fat and the casein to a large extent determine the yield of cheese. There are other things that come in, such as the skill of the maker and the quality of the milk, but the fat and the casein for all practical purposes determine the value of the milk for cheese-making purposes. Is the yield of cheese in proportion to the fat and the casein? I say, for all practical purposes "Yes."

The next question is, Is the loss of fat and casein in the whey the same from milk with different percentages of fat? I will give you the composition of the whey as determined by our chemist:

	H. (rich milk.)	L. (poor milk.)	Average.
Water	93.19	93.36	93.27
Fat	.28	.20	.24
Casein	.13	.12	.12
Albumen	.86	.82	.84
Sugar, ash, etc	5.54	5.50	5.53
	100	100	100

So we find there is a slightly greater loss of fat and casein in the whey from the richer milk as compared with the poorer milk. This chart shows you the average percentage of fat by months as determined by the Babcock tester. In this other chart is shown the average percentage of fat by chemical analysis. In every case there was a slightly higher percentage of fat in the whey from the richer milk—for the month of April, .19 for H. milk and .16 per cent. of fat in whey from L., or poor milk, and so on all the way through. When we were handling the very rich milk we also found that more butter-fat pressed out of the cheese when they were pressed If you are handling rich milk it must be handled very carefully or there will be a great deal of loss in the whey. First in the whey, then in pressing, and then in the curing room. That is our experience. Of the total fat in the milk from a low percentage of fat, 5.8 per cent. was lost in the whey; from the rich milk 6.2 per cent. as determined by chemical analysis.

The next question that I shall ask you is this: Is the loss in weight of cheese by curing the same from the high and the low percentage of fat? I have figured out the average loss in the weight at the end of one month. The loss of weight from the rich milk cheese was 4.8 per cent; that is, out of every one hundred pounds of cheese we put into the curing room 4.8 pounds were lost in curing, largely by means of evaporation. Of the low percentage of fat the loss was 5.2. Now why is there that difference? I cannot tell you altogether, but I think I can offer an explanation. There is a cheese that weighs somewhere about twenty-six and a-half pounds, and there is another which weighs thirty-two and a-halt pounds. There is a larger surface in proportion to the weight of the cheese in the one case than there is

in the other, and the larger the surface of the cheese in proportion to its weight the greater the evaporation. So I think the explanation of the fact that there is a greater loss from the poor milk cheese in curing as compared with the rich was in the larger surface, according to weight, which was exposed for evaporation. The next point that I wish to call your attention to is this: Does the composition of the milk affect the composition of the cheese? I have to refer to our chemist again to answer that question. If you follow this line right across on the chart you will find that the average percentage of water in this H. milk was 87 per cent.; in the cheese made from the rich milk there was 33 per cent. of water. The average percentage of water in the L. milk was 88.1; the percentage of water in the cheese was 34.1.

What about the fat in the milk? You will see from the chart that the higher percentage of fat in the milk gave a higher percentage of fat in the cured cheese—34.3 per cent. as compared with 30.7. The casein seems to be more nearly alike Where the percentage of casein in the milk was 2.5 and 2.4 respectively, the percentage of casein in the cured cheese was 20.1 and 21.7, So we may say that the composition of the milk does affect the composition of the cheese. The cheese made from the lower percentage of fat in the milk has a slightly higher percentage of water, a lower percentage of fat, and a higher percentage of casein. These are the three things we are most concerned about. The next question is perhaps the most important of them all. Does the composition of the milk affect the quality of the cheese? In the time given to a speaker here I had much rather not discuss this point. I will give you my reasons. This question of the quality of cheese is a most difficult and delicate one. In the first place tastes differ. No two persons have the same taste. The cheese that suits one person does not suit another. Talking with an English importer last Tuesday in Toronto, he said they had at least nine distinct classes of persons to whom they had to cater. Some of their customers liked a firm cheese, and they tried to get it for them; others liked a moist fat cheese, and they tried to get that; some people liked cheese with no coloring in it; others with higher coloring; some liked cheese with a very mild flavor; others with a strong flavor. And so there are so many different tastes that it is a very difficult matter to say what determines the "quality" of a cheese. There is the first question which presents itself. Another thing: How are we to arrive at the quality of the cheese? If I were to ask Mr. Ballantyne or Mr. McLaren, or some of your other buyers to decide upon a scale of points we would likely have as many different scales as judges. It is difficult to get cheese buyers to agree on a scale of points for judging cheese. These are some of the difficulties that present themselves to us when we come to discuss the question of quality in cheese. What is quality? Is there any man here who can say that this kind of cheese will suit everybody in the world? There is no man bold enough. He would get into about the same kind of muddle as a man who would attempt to pick out a wife to suit every other man. We have to study this question of taste. We must come to some basis. What are we going to do? I have on this chart here a scale of points that I believe Mr. Ballantyne formulated for our dairy students It is slightly different from the scale used by Mr. McLaren in judging cheese at the World's Fair. The scale of points is: "Flavor," 35 out of every 100 points. Flavor is the most important thing. What is flavor? You can get the flavor largely when you pull out a plug from the cheese. But there are some flavors that you cannot get by smell, for instance a bitter flavor. I don't think you can get that by smell—you get it better by taste. We decide the flavor by the nose and the tongue. One of the most important requisites for a good dairyman is a good nose. A person who has not a good sense of smell can never make a success of cheese making or butter making, because we get the flavor of cheese and butter largely by the smell. As to what flavor is, and what it should not be, I leave that for Mr. McLaren or some of the expert judges. The next point is the "Closeness." We have allowed 20 points out of 100 for closeness. How do we determine it? We pull the plug out and see if it has any holes in it. You test that by its appearance. I do not just know what the objections are to an open cheese, but I believe the cheese that is open will not keep so well, nor is it so good in flavor as a rule. The next point in the scale is "Even color." Here is where the question of color comes in. Some people say

that we should have cheese with no coloring at all. Others like it highly colored. We have come to the conclusion that an even color is the best way to put it. We give fifteen points for that. The color is judged by the eye. The next is the "Texture." When an expert judges cheese he will probably take a piece of the cheese and work it between his thumb and finger and decide on its texture in that way. It should not be pasty nor hard. These are some of the chief points. For "Finish" we give ten points. What have been the results when we come to average them up? I have in this first column here the score for the cheese for 1894. There were forty-three experiments in that year.

Year.	No. experiments.	Av. p. c. fat.	Flavor.		Closeness.		Even color.		Texture.		Finish.	Total.	
			Possible score.	Points scored.	Possible score.	Points scored.	Possible score.	Points scored.	Possible score.	Points scored.	Points scored.	Possible score.	Points scored.
1894	43	3.94	1595	1350.5	860	761.0	645	591.0	860	720.0	430	4300	3852.5
		3.37	1505	1354.5	860	758.5	645	606.5	860	746 5	430	4300	3896.0
1895 mos.)	72	3.98	2520	2147.5	1440	1289.0	1080	1009	1440	1249.5	720	7200	6415.5
		3.17	2520	2133.0	1440	1278.5	1080	1017	1440	1251.0	720	7200	6399.0

We have found that the tendency of the cheese made from the richer milk is to be slightly pasty. You makers know what a pasty cheese is. It is a cheese that sticks to your fingers—a very objectionable cheese. The tendency of the poorer milk, on the other hand, has been to be somewhat harsh in texture. Both are objectionable cheese. What we want is the medium. Take the total for six months of 1895. (I have left out September for this reason: One of our patrons, while I was away, broke his contract and fed brewers' grains; when I came home there was trouble in the camp. I went over to the farm, and I found that the man had received word from the College and that he had ceased feeding grains. But for two weeks afterwards the flavor was discernible in the cheese. There were no brewers' grains fed after September 12th. Two of the cheese on the table were made on the 25th of September, and they still have the flavor of brewers' grains. Some of the cheese were made out of the milk with brewers' grains and some not, and for that reason I have left out the month of September altogether, when we come to consider the quality, because I have thought it not fair to put in the score from these cheese). Taking the average of six months—April to October—the average percentage of fat was 3.98 in the one lot of milk and 3 17 in the other. Out of the total possible score of 7,200 points the rich milk scored 6,415 and the poor milk 6,399½ in 1895. In 1894 the score was 3,852.5 for rich milk cheese as compared with 3,896 out of a possible 4,300 for the poorer milk cheese. What percentage of fat should milk contain in order to make good Cheddar cheese? I should say that you need milk with about three and a half per cent of fat. If you get four per cent. milk and over, I don't think, so far as I can see at the present time, that it is advisable to make that class of milk into a Cheddar cheese, because there will be more loss of fat in the whey, and because there is a tendency to pastiness. Such milk can be more profitably made into butter. I give you that as my opinion.

What is the most correct system of dividing the proceeds amongst our patrons? This is perhaps the kernel of the whole thing. We have had three systems of paying. I have spoken of the wisdom and fairness of these. I consider that paying according to the butter-fat is much fairer than paying according to the volume of the milk. I have never said anything nor written anything against the Babcock tester. I believe the Babcock tester, properly handled, will give us the percentage of fat in each patron's milk, and that it would be better to divide on the basis of the butter-fat than on the weight of milk, but I believe there is another and better system. That is to take into consideration the butter-fat and the casein. We cannot determine this without chemical analysis, but our experiments go to prove that the percentage of casein in the milk is fairly constant. It remains about 2.4 or 2.5. How are we going to overcome this diffi-

culty of determining the casein? I have suggested the plan of adding two per cent. to the fat. Some say they cannot understand what difference that will make. I want to make that clear. Here is a man whose milk tests three per cent. of fat, and another whose test is four per cent. of fat. If we divide on the fat basis we give the first man three-sevenths and the other four-sevenths of the money to be divided. If we add two per cent. to the fat we make the first one five and the other six. We have now eleven parts to divide, of which the first receives five-elevenths and the second six-elevenths—a difference in the first case of one-seventh and in the second case of one-eleventh. That comes very nearly in accordance with the yield of cheese. I hold that this is the best system we know at present. It is more just than any other. Before commencing this experimental work I was prejudiced in favor of dividing on the fat basis, because up to that time the results of experiments seemed to point strongly in the direction of dividing on the fat basis only. But after two years' experience I have come to the conclusion that we should recognize the casein in the milk also when dividing the proceeds among the patrons of cheese factories. If we add two per cent. (which represents the casein) to the fat it will give very nearly justice to each man. It will perhaps take a little off the richer milk as compared with the fat basis only. It does that to some extent when we get over four per cent. of fat. It adds a little to the poorer milk (as compared with the fat basis), and it sort of strikes an average that to my mind comes nearer to the correct thing than anything that has been proposed. I would lay the matter before the patrons, and if they were satisfied to divide the proceeds according to the weight of the milk let them do it. If they want to divide the proceeds on the fat basis I would try to meet them. If they want the fat, plus two per cent., I would try and let them have that. I don't believe in forcing anything upon the patrons of any cheese factory. I think the matter should be laid plainly and clearly before them, and that they should have a voice in deciding this matter. I have tried to bring before you this morning the chief points in connection with the three systems, and to give you a brief outline of our work. I have no doubt that there are some points you do not understand and I shall be pleased to answer questions.

HOG BREEDING.

Mr. THEODORE LOUIS again spoke on the hog. He said: I intend this morning to take up a part of the subject of breeding. I know it is one of the greatest sciences. You here in Canada have a future before you that we have not in the United States. Your Government assists you in a great many matters, whereas we can find no assistance in the matter of markets. When I listened to Professor Robertson last night, I found a weighty argument in your favor, that the Government is trying to find markets for you. Now, while the possibility lies before you that you can successfully compete in your dairy by-products with Denmark and other countries that put the finest of bacon and ham upon the English market, and while you have studied the dairy question and are still studying it to the highest perfection, the stranger who comes into your midst cannot help but admire the intelligence and energy with which you pursue these questions. It is right that you should experiment to the utmost in dairying. I have experimented to the utmost to study the life of the animal that I represent. I never go to Chicago but what I step into Armour's factory, and there one great lesson is brought before us—not a hair nor a drop of blood is lost that comes from the hog. Where you dairy farmers have a by-product so valuable for feeding hogs, it must necessarily be one of your great studies how to make the most out of that by-product. At Armour's factory, all the labor employed about the slaughter-house is paid for out of the by-products. Is it not possible for the dairy-farmer to pay his hired help and other farm expenses out of his by-product? But I want to talk about breeding this morning. You must be the selector of your breed of hogs. I believe that it is in the power of every breeder to formulate an animal by intelligent breeding that will answer his purpose. I believe if I

took my Poland-Chinas, and fed them on the more nitrogenous food that you are in possession of for a few generations, and adhered to the principle of pasturing, and gave them more range to run about, that I could formulate an animal that would answer equally as well the purpose of those animals which they have in Denmark, and that they boast so much of. I think this is one of the examples that lies before you, that you may breed an animal for years that will give you the best satisfaction. Then comes the science of feeding with it. In the States—I do not know how it is here—there is a tendency to breed from young sows, and every year the sow is changed. They object to the aged mother sow upon the farm, because there is a danger of her overlying her pigs. But the consequences of immature breeding are equally dangerous. When you follow a course of immature breeding from year to year, and make your selection always from your pigs to breed from, remember that you are pursuing a downward course in size, in constitution and in vigor. The animal must perfect herself before we can expect to have perfect offspring, and in the immature animal you will certainly never have this. You will have a deficiency in both size and strength after proceeding along that line for a few years. How shall we select a good sow? I said yesterday that a sow gives from twenty to thirty pounds of milk during twenty-four hours, and I know just what I am talking about, because I have tested it with the scales. If eleven pounds of milk give us one pound of growth in an animal of from seventy to one hundred pounds, it stands to reason that if my litter have gained three or four pounds in twenty-four hours, that the milk must have amounted to thirty or forty pounds. This, then, should be our selection—a good milking mother, one of a quiet disposition and of the build that we desire. I have here a chart taken from life at my advice. It is a young sow, but remember that she has all the qualifications of a good mother. She is broad in her forehead, she has her eyes prominent and wide apart, and she stands wide apart with her forelegs, and she was selected with the first cross. I select a sow for the same purpose as you do a cow. I want a good milker. If you adhere to this principle throughout your line of breeding, you will be astonished what a lot of good milking sows you will get, and remember that the good milking sow is always the good mother. Here we have the first cross. You see the improvement that has been made. The improvement is even made down to the hoofs, as the animal is securer upon its feet. It is a better build altogether. Here is the thermometer of the hog (pointing to the tail). One curl indicates good vigor and life; two curls are just about the best sign of health that I know of. (Laughter.) What kind of an animal should we refuse for breeding purposes? Always refuse an animal that has a drop back of the shoulder. Never choose for a sow or a sire those so affected, because it denotes a shortness of the ribs, and there is where the vitality of the animal lies. You must have an animal of great vitality in order that it shall be a profitable feeder. We want to select an animal that is deep through the chest, that is deep through the flank, and for the sow, I would not want one so closely built as I would have the sire. As a rule, every man selects his pig, or a great many do, when they are nursing. They say, "Oh, here is the prettiest pig of the lot; that is going to be my future sow." Never select a pig that way. Wait till the pigs have been weaned and have been fed on natural feed, and then take from the litter the animal that shows the greatest improvement, and that suits you best according to your judgment for your breeding purposes. Remember that a pig, after it has done nursing, may take on an entirely different conformation, and not suit you probably. If you have any questions to ask me, I shall be glad to answer them.

A MEMBER: What about blind staggers?

Mr. LOUIS: Blind staggers come from one of the great errors of feeding. It is not a hereditary disease in swine. When you and I eat too much we have a headache. There are men who feed swine regardless of their power of digestion and assimilation, and they gorge their animals with one kind of food. Suppose you feed your hogs on whey, and whey alone, and do not mix some oilmeal and shorts with the whey, you will probably find that you have blind staggers among your animals. When the digestive organs become so disturbed that constipation has taken place and digestion has ceased, inflammation of the brain sets in. Then the next step is blind staggers. The

hog has a severe pain in its forehead, and it commences to run around in a circle, and is almost blind. The only remedy I know of is to give the animal physic. Give it some common clearing medicine to remove the constipation, and then take a knife and split open the skin of its forehead right down to its nose, and put some salt and pepper in there in order to relieve the irritation of the brain.

A MEMBER: At what age should a young sow be bred?

Mr. LOUIS: A sow should not be bred until she is eight or nine months of age.

A MEMBER: What about the age of the sire?

Mr. LOUIS. He should not be used until about the same age and he should be retained upon the farm. I think that every farmer must become more or less a breeder to become successful. I would advise every farmer to hold his sows when they have satisfaction in one line. If you have a line of sows, hold yourselves to that same line and make your improvement by the sire. Never use your sire any younger than eight or nine months; never use him to excess.

A MEMBER: At what age would you put pigs into pasture? How long and what kind of pasture?

Mr. LOUIS: That is one of the greatest arts. As I said before, your pigs should have pasture. I do not know to what extent you have pasture for your hogs, but I could not think for one moment that my pigs should not enter upon pasture as soon as they are able to run with the sow. I want my pigs to run upon a clover pasture. You will also find barley mixed with winter rye a satisfactory pasture. You will have healthier and better hogs if they have pasture. We aim to let our hogs run in pasture in May when the clover has fair hold of the field, and when our hogs are once upon the pasture we feed twice a day.

A MEMBER: Do you ring your hogs?

Mr. LOUIS: No, we never ring our hogs. If you give them the condiment that I spoke of yesterday, namely, salt and charcoal, there is no need to ring them. A hog roots simply because there is a want of phosphate to make bone growth. The higher you feed the hog the more he will root. If a man is under obligation to ring his hogs it is best to put a ring on each side of the nose; never put a ring in the centre, because you will thus very often disturb the nerves that are connected with the eye and the brain. You will often notice that when you ring the nose right through your pigs will draw back from the trough. When our pigs are weaned (we let them nurse three months) we generally have in readiness two or three acres of peas. You can grow peas far superior to ours I know, because when I want a new kind I generally send here to get them, and I am always scared of getting the Canada thistle with them. (Laughter.) We sow as a rule upon our farm five acres of peas to feed our hogs on. Right in connection with your business I don't think you can do any better than this. I have movable fences upon my farm. If any of you gentlemen desire to get a pattern of them I shall be pleased to give you a drawing so that you can make them. (See page 171.) When our pigs are weaned—and we generally make it a point to breed our sows closely together, so that our pigs are nearly all of an age, as I said yesterday—we commence to cut the peas. I take a wheelbarrow and cut a few peas and place them on the feeding floor. Remember, you can never make a sudden change from one feed to another that will be accomplished with success. When you make a change of feed do it gradually. When I have fed the pigs nearly a week on the peas that I have cut I turn them onto about two acres just when the peas are ready for table use. If you have fed those pigs about eight days, you will be surprised how methodically they will go to work and commence to crop the peas and eat them. Here comes a time when you have very little trouble with your pigs. You have not got to do something for them three times a day. They are right there in the peas helping themselves. I give them some swill in the sties. Remember that peameal is often constipating. Whatever you do watch constipation in your hogs. I do not care whether you are feeding skim milk or peas, or anything, watch constipation. When the peas are nearly all harvested and the gleaning process commences, I have a piece of sweet corn

alongside that field, which I commence to cut and give them. Remember that when the gleaning process is on your pigs will fall away. They must not do that; they must continue to grow right up to the block.

A MEMBER: At what age would these pigs be that you speak of?

Mr. LOUIS: From about three months old. I want to give a word of caution right here. If you have two fields of peas and the pigs have been gleaning in one of them for a week or two while you have fed them corn in addition, do not turn them at once into the other field where the peas are ripe. If you do you will certainly have one or two dead pigs. They will go at them so ravenously that they will swallow the peas whole.

A MEMBER: Do you breed your sows twice a year?

Mr. LOUIS: As a rule I do not; only exceptionally. It should never be a practice, especially if you are breeding from young sows, to breed twice. If she has gone through the strain of breeding and raising a litter she should not be exposed again; she should be allowed to perfect herself in growth. If we wish to breed two litters in one year we should take an old sow to do it.

A MEMBER: Did you ever have any trouble with sows killing their pigs?

Mr. LOUIS: I had in former years, in my infancy of swine breeding, but I never have now a days. If you feed your sows right there will be very little danger of her eating her pigs. If you have given her some roots every day and shorts during the winter you will never have any trouble in this direction. I have never known a sow that runs to pasture to eat her pigs. When they do it is simply owing to the feverish condition that you have put them in.

A MEMBER: Do you recommend the roots to be boiled?

Mr. LOUIS: If you have conveniences to boil them, yes; if not they are just as well fed raw.

A MEMBER: How do you feed your squash?

Mr. LOUIS: We feed them both raw and steamed. The advantage the squash has over the pumpkin is that if the pumpkin freezes it is worthless; but it is not so with the squash. We can put a great lot of squash, three or four loads, in a straw pile and use them along in December and January, In the winter time we steam them. We cut them up, put them in a barrel and steam them thoroughly. Then we mix our other food with them. We do not use the hard shell; we use the larger yellow variety of squash. Remember when you are feeding the animal, especially if you have fed him on grain or corn, that his teeth have become sore and it is better to cut the squash.

A MEMBER: How do you keep your squash during the winter?

Mr. LOUIS: We have a hole in the straw pile and put them right in there and cover the straw over them. We have no cellar to keep them in.

A MEMBER: If a sow has eaten one pig what will prevent her from eating the whole litter?

Mr. LOUIS: Take the pigs away and then give her a large piece of fat pork, as I told you yesterday, or some linseed oil.

A MEMBER: Have you any experience with black tooth, and is it connected with blind staggers?

Mr. LOUIS: No, they are not connected. When you are feeding a great deal of acidulated food it will often cause black tooth. The best way is to pick out the black tooth with a pair of pincers.

A MEMBER: What would you make charcoal out of if you had no corn cob?

Mr. LOUIS: Hard wood.

A MEMBER: What kind of wood would be best, maple or elm?

Mr. LOUIS: Maple would give you the best results.

A MEMBER: Do you approve of feeding oil cake to fatten hogs?

Mr. LOUIS: I approve of feeding ground oil cake under all and every condition. There is nothing that gives me so much satisfaction as that a portion of my hogs' ration shall be oil cake.

A MEMBER: Do you approve of much straw in the pens for breeding purposes?

Mr. LOUIS: Yes. Here is my practise. A fortnight before a sow farrows I put her into the pen, and I feed her there mornings and nights, but I let her go along with the rest of the sows, so that she does not become scared. I do this up to within three days of farrowing, and I then confine her in the stall all the time. A sow carries her young 112 days—116 days at the outside. The sow knows that she has been treated well in that stall, and that there is no danger about it; and remember that the sow always looks out a secure place in which to farrow. The second day after I have confined her I give her plenty of bedding and let her make her own nest. Of course you may have too much bedding. You will have to use your own judgment about that.

PORTABLE HURDLE FENCE.

Figures 1 and 2 represent the movable hurdle fence used on the farm of Theodore Louis, Wisconsin, who has kindly furnished these diagrams for this report. It is used for hurdling swine, but would be equally valuable for sheep and cattle. The width be-

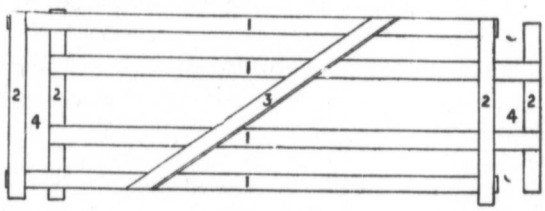


FIG. I.

tween the bars and height of the hurdles may be made to suit the sort of animals to be kept by it: (1) Fence board twelve feet long; (2) one by three or four inch slats; (3) two-inch slats. Observe that slat (2) is reversed at every other panel.

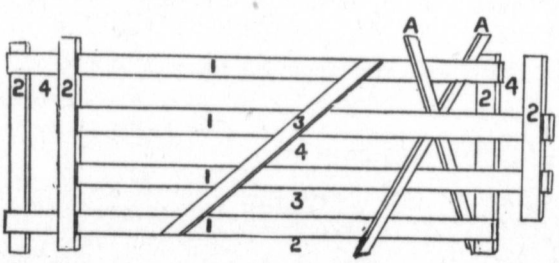


FIG. II.

(4) This open space must be one inch wider than slat (No. 2). The fence stands worm or zigzag fashion; the right-hand end of Fig. 1 protruding through the left-hand end of Fig. 2, and so on throughout the whole fence. A A represent stakes driven, as shown in Fig. 2, to hold the fence firm.

The convention then adjourned until the afternoon.

THIRD DAY—AFTERNOON SESSION.

The PRESIDENT: I am glad to see, on this the closing afternoon, so many still in attendance. I am sure you will be rewarded for being here, because a good deal of the work this afternoon will be of an interesting character. The first thing upon the programme is the Auditors' report. I will ask the Secretary to read it. I am glad to be able to announce to you that the funds of the Association are in a satisfactory condition. We have a considerable surplus on hand—better than we had last year. The Board have endeavored to make every dollar go as far as possible, and consequently we were glad to hear Mr. Dryden say that they were pleased with the way in which our funds are spent, and that they hold us up as a model Association. I had a telegram this afternoon from the Eastern Dairymen's Association in reply to the message we wired them. It reads as follows: "Thanks for your kindly greeting, which is reciprocated here. This is the first session of our convention, and it is a great success. Over 300 farmers present. Edward Kidd, president." If our good friend Mr. Kidd could have dropped in here yesterday and seen some thousand persons in this opera house he would have been convinced that they had scarcely realized our wishes that their convention would be as successful as ours.

REPORT OF THE TREASURER.

Mr. WHEATON then read the annual report of the Treasurer, which will be found in the appendix. The report was carried unanimously.

The PRESIDENT: We now come to the report of the Committee on Resolutions. These resolutions are presented with the approval of the members of the Committee, and they are moved by gentlemen who have put their names to them and requested that I should read them from the chair, instead of having them read in the body of the hall. I will give any of these gentlemen, or any of you, the privilege of speaking to any of these resolutions. If there is anything in any of them that you object to, get up and say so. We want perfectly free discussion. We do not want to pass anything here that does not voice the sentiments of this Association.

A VOTE OF THANKS.

Moved by A. F. MCLAREN, and seconded by A. T. BELL, That the members of the Dairymen's Association of Western Ontario desire hereby to thank the citizens of Woodstock for the cordial welcome and hospitality extended to them during this Convention, and that the secretary of this Association is requested to formally thank the Mayor and members of the Town Council for generously providing this splendid audience room for the meetings of the convention free of cost; and also the President and members of the Woodstock Board of Trade for the banquet which is to be given in honor of this Association this evening, and for their efforts to make this convention the magnificent success which it has proved.—Carried.

FAVORING THE USE OF THE BABCOCK TESTER.

Moved by R. M. BALLANTYNE, seconded by P. DOWNHAM, That we hereby express the opinion of the Dairymen's Association of Western Ontario in favor of the system of paying for milk according to quality, and our belief that the Babcock tester affords a just and honest test of quality. We urge its universal use throughout the factories of this district, believing that it will promote both honesty and improvement among patrons and enhance the quality of our cheese. In the interests of honesty, justice and high quality, we ask the directors and officers of this Association to continue their efforts to secure the use of the Babcock tester and payment for milk according to quality at every factory in this western district."—Carried.

CONDEMNING THE RETURNING OF WHEY IN MILK CANS.

Moved by J. A. GRAY, of Elma, seconded by GEO. MACDONALD, of Bluevale, That we, the members of the Western Dairymen's Association in convention assembled, hereby endorse the views expressed by our Directors for 1895, in their annual report, on the subject of carrying whey in the milk cans; and we further pledge ourselves to go back to our various factories and to use our utmost efforts to influence our fellow patrons and factory directors to put a stop to a practice which is dangerous to the interests of the cheese industry, and which prevents the uniform improvement towards a high standard of quality which it is the aim of these conventions and the work of this Association to promote. We hereby ask the Directors and officers of this Association to assist us and to co-operate with local boards of factory directors in an effort to secure concerted action to do away with a system which has produced baneful results in the past and still stands in the way of improvement.—Carried.

INSTRUCTION AND INSPECTION.

Moved by D. A. DEMPSEY, seconded by GEO. HATELY, That we. the members of the Western Dairymen's Association and the dairymen of this district in convention assembled, cordially endorse the recommendation of the directors for the past year in favor of increased inspection—that is, increased instruction among the factories through co-operative effort; and we pledge our support to the directors of the present year in such steps as they may see fit to take in order to carry out such a policy. In view of the way in which inspection and instruction are now carried on in Quebec, Eastern Ontario and elsewhere, we urgently suggest to the directors of all the cheese factories in this district the necessity of co-operating with this Association to secure more satisfactory and general instruction and efficient co-operation in order to bring about uniformity in the quality of "Ingersoll Cheese."

Mr. BUTCHERT: What are the duties that the Directors have laid down for the inspectors?

The PRESIDENT: The object of the Directors is to induce factories to co operate with them in order that the whole of this western district may be evenly divided into groups in which special instruction shall be given by inspectors who will be appointed. In other words to be able to overtake the work throughout the whole western district by having men going about giving special instructions in a similar way to what Mr. Millar does in the early part of the season. The idea is that he has not been able to overtake all the work. The directors cannot do that with the present funds and they ask for concerted action. In the province of Quebec the local government gives them a special grant towards this work of inspection of factories and grouping together so that the cheese of the whole district can be brought up to one uniform standard. This is the hope and object of the Directors. I may say that I have no hope that the Directors will be able to carry it out until it is taken up by concerted action on the part of the factories. Perhaps the passing of this resolution will do good, both in the way of public opinion and active public effort.

The resolution was then carried unanimously.

The PRESIDENT: Of course you will observe that these resolutions do not bind you in a formal way, but what is felt is that when the members of this Association and of the dairy interests represented here pass resolutions they are not meaningless, and that you will go back and try and influence those who are not here to carry out the suggestions here laid down.

SELLING CHEESE ON THE CALL BOARD.

Moved by JAMES HARLEY, seconded by JOHN PRAIN, That the members of this Association, after hearing the discussion of the question of the present condition of our cheese markets, and the various suggestions made as to how it can be improved, are of the opinion that the easiest and most feasible plan to bring about a reform and thus to promote the interests of the producer, would be for the salesmen on each market to agree to sell their cheese on the Call Board, and not to sell them off the Board. And we hereby request the Board of Directors for the present year to make an effort to bring about an agreement to this effect on the various markets, and to co-operate with the management of these markets in order to secure the more vigilant enforcement of the rules of these local market boards, especially in reference to the sale and bargaining for the sale of cheese after the Call is over.

The PRESIDENT: This is a question regarding which we shall be glad to hear from the mover and seconder or any gentleman in this hall.

Mr. BUTCHERT: What are the advantages to be gained in selling the cheese on the call board over that of private sales?

The PRESIDENT: That was exactly the question discussed on Tuesday. I will not give you my opinion now, because I do not want to take up your time. What these gentlemen on Tuesday pointed out was that if the salesmen would agree to sell their cheese on the call board only, there would be higher prices paid; that the reason the buyers did not bid at all very often was because they knew before the market started that the salesmen were not going to sell. You know that that is the case at most of our markets. Before the bidding begins the buyers have absolute knowledge almost that the salesmen are not going to sell that day at such prices as they think are going to be current. It has

occurred over and over again that the buyers will not bid at the call board, for that reason, what they would bid if they knew that you were going to sell. Consequently they discourage the call system altogether, knowing that afterwards they can buy the cheese privately, and very often better than they would have done if they had bid against each other on the call board.

Mr. BUTCHERT: You think the call board system then is in favor of the sellers and patrons of the cheese factories?

The PRESIDENT: As the result of the observation of years I am perfectly satisfied that the call board system is in favor of the salesmen and producer, and against the buyers. If this is not your belief vote the resolution down.

Mr. BUTCHERT: I am now at the point where I want to get all I can for the cheese I manufacture. Of course the other people are looking after their interests. If the call system is going to be a help to the cheese industry and get better prices for the cheese, then I think the sellers should be backed up by the patrons. If it is going to be a detriment to the patrons of the factory the patrons ought to know, and then caution their salesmen against it. This resolution should be perfectly understood, because our salesmen might want to know the feelings of the patrons before they do this. I would like to hear this talked over a little.

Mr. EAGLE: This last year I sold, I believe, about 9,000 boxes of cheese, so I should know what I am talking about. I have sold them on Brantford market and sold them on every market day. I sold them on the call system. If the gentleman would try, as I have done, the call system he would be satisfied that it is the best. There is a good deal less trouble selling cheese that way than any other, and after a man has adopted this system for one or two years he does not want to drop it. If there were two men on each board at Woodstock, Ingersoll, London, Listowel that would adopt the system of selling every market day, in three years, time they would be getting more money, taking average sales. I sold on Brantford board to Cook, of Ingersoll, and three consecutive times, immediately after I had sold, there was a slump of half a cent. Of course, sometimes there is a rise, but if I miss one week I will average it up on the next. Speaking for myself and members of the Brantford board we are strongly in favor of the call system, believing that there is more money in it for the salesmen and that it is better for the buyer.

Mr. GEO. HATELY then made a few remarks along the line of his paper, which, in his absence on the first day, was read by the Secretary.

The PRESIDENT: It might be asked—and I just mention it to bring out ideas—why, if the call board favors the seller, some of the buyers should also advocate the system? My own belief is that if these buyers were to come and tell us all that is in their minds they would prefer that the call board system should be done away with. But there are some reasons that make them desire to see it a success. I have seen buyers come to this market over and over again when they actually had orders for cheese and were willing to pay higher prices than the English market warranted, and yet they could not get a pound of cheese, because the salesmen were in mortal terror that they were not going to get the market price, and then perhaps at the next market they were ready to sell and the buyers did not want the stuff. Speaking of this question, as an observer, I want to say that my sympathies are entirely with the salesmen and producer, and I would not give my opinion away for the opinion of anybody in the trade. On this matter—a matter which I have studied and observed from an independent standpoint—I hold very strong opinions, and I speak with emphasis upon this subject. The buyer's time is worth a good deal of money. As one gentleman said on Tuesday, some of these buyers spend a lot of money, and they have to. They waste a perfect gold mine of time. Whose pocket does it come out of? In the end it comes out of the producer. There is not any doubt about that. If you could facilitate the business so that these buyers could save time, and thus lessen the expense, that would press prices a cent higher. Looking at this question from any standpoint you like it is in the interests of the salesmen to put their cheese on the board and sell them, and not off the board.

Mr. HARLEY, as the mover of the resolution, thought it was important that it should be passed and acted upon. The call system had worked well for a time, but it had fallen into disrepute, possibly through the fault of the salesmen, but the buyers were not guiltless. The conditions of the call system were that they should sell their cheese the day of the market on the board, and that if not sold on the board they should not sell them that day, neither negotiate for their purchase. But it had frequently occurred that buyers would, the day after the market, raise the price a little and purchase the cheese of the salesmen who were at the market, and the consequence had been that salesmen had got into the habit of holding their cheese. Very little of the cheese around Woodstock had been sold on the market the past season; it had mostly been disposed of at the factories the next day. This was certainly going to ruin the markets. Yet the markets were a necessity. He thought salesmen should make it a rule to sell on the market and nowhere else. This would have the tendency to raise the standard of quality, because the buyers would offer higher prices for the better makes. If the factory that he represented did not make as good cheese as Strathallan or Bright it should suffer the consequences by taking a less price. The buyers, he believed, were gentlemen who acted honestly and uprightly, and when they went on the market they would bid whatever the make was worth.

Mr. PRAIN (Harriston), said he had been one of those to agitate for the call system, but latterly he had found that owing to the hole-and-corner methods that were being pursued, it was not satisfactory, and he had sold most of his cheese at home. He remembered on one occasion he sold a lot of cheese on the board for eight cents. It was the only lot sold on the board, and the next day he found the buyers paying eight and one-quarter cents for the cheese of his neighbors. He condemned the hole and corner business altogether.

Mr. E. H. GREEN thought that if the salesmen would make it a rule to sell on the board, and on the board alone, it would be better for the patrons and the salesmen and all parties concerned.

The resolution, on being put, was carried unanimously.

BRANDING CHEESE.

Moved by Mr. T. BALLANTYNE, and seconded by Mr. HATELY, That this Convention of Dairymen assembled in the Town of Woodstock would strongly recommend that such regulations be adopted, and such laws be enacted as will compel our cheese factories to brand on each cheese the date and month upon which th cheese was made, and also the word "Canadian," but that no registered number for each factory be put upon the cheese, as we think it would result in complications and difficulties and be an injury to the cheese trade of Canada.

The PRESIDENT: That brings up the vexed question of branding. I will ask Mr. Ballantyne to speak on it.

Mr. BALLANTYNE said that thirty years ago it used to be the practice to brand every cheese with the month and the day of manufacture, but it had got into disuse. It was necessary, almost absolutely necessary, that the day and the month should be on the cheese. It was of the utmost importance that their customers in England, on whom they were dependent, should feel that they were being honorably dealt with. He had heard of no reason in favor of not branding them except that they were able to sell one month's cheese as something else. But the maker gained nothing by that for he sold them to the dealer for what they really were. He had been in the business for many years, and he had never sold an October cheese for a September, and he wanted the English customers to know that they were dealing with honorable people. He would not favor branding the cheese with anything but the date of manufacture and the word "Canada," but those words should be put on the cheese in the press, and

then it would be impossible to erase them. But if it was to be done at all they wanted the law to enforce it. The dairy Commissioner had advocated a registered number. The resolution before them disapproved of that, and he thought there was not a cheese maker present but would agree with that part of the resolution. If the make of the factories were all the same, if the quality of the cheese at each factory were the same from the commencement of the season to the end of the season, there would be no difficulty. But every cheese maker knew that it was the very opposite. At one time a factory might have very fine cheese, and at another very poor. They might have the best makers, and yet have a percentage of poor cheese from causes over which the makers had no control. Supposing one of the poor specimens got into the hands of a dealer. He would make a memorandum of the registered number and refuse to buy any more of that factory's output. As it was, even with the private marks that were used by exporters, the English dealers would sometimes write and ask not to buy any more of a certain mark. He knew several factories this year that usually turned out the very best whose make had shown, through causes over which they had no control, very bad flavor. Had these cheese been branded with a number the English importers would have refused to take any more from those factories. There was nothing to be gained by a registered number, but there was everything to be gained by establishing confidence in the minds of their customers. They wanted the the word "Canada" branded to show that the cheese were not adulterated. As an instance of the necessity of confidence, he pointed out that there was a time when New York State cheese was selling one and a half cents above Canadian cheese, but they commenced to adulterate, the importer lost confidence in American cheese and the result was that, although there was as good cheese being made in the United States as here, Canadian cheese stood higher on the market than American cheese.

Mr. GREEN: I would like to ask Mr. Ballantyne if it is not a fact that there is an unwarranted prejudice in the Old Country against the make of certain months of the year?

Mr. BALLANTYNE: The time was when there was a strong prejudice in favor of June in preference to July, but there is none of that to-day, as we know July cheese are better than June cheese.

The resolution was carried unanimously.

IN MEMORIAM.

Moved by THOS. BALLANTYNE and seconded by JNO. S. PEARCE, That the members of the Dairymen's Association of Western Ontario in convention assembled at Woodstock, having learned of the recent death of J. B. HARRIS, ESQ., Antwerp, N.Y., would express their sincere regret at the loss of one who formerly rendered valuable services to the cheese industry of this district when acting as travelling instructor for this Association, and would tender to the relatives and friends of the deceased their sincere sympathy in their loss, and that a copy of this resolution be forwarded by the Secretary to the bereaved family.—Carried.

REPORT OF COMMITTEE ON DAIRY UTENSILS.

The following report of the Committee on Dairy Utensils was then read by Inspector Millar and adopted:

We, your Committee on Dairy Utensils, find on exhibition one pair of curd knives, manufactured by J. F. Wamsley, Woodstock. They are well made and finished nicely. Also an engine curd mill and a gang press by Whitelaw, of Woodstock; a gang press by Richardson & Webster, St. Marys; gang press hoops by C. H. Slawson & Co., Ingersoll; and two samples of Windsor dairy salt. We take pleasure in recommending the above to cheese-makers and proprietors of factories.

All of which is respectfully submitted.

T. B. MILLAR,
J. F. WILLIAMS.

REPORT OF THE NOMINATING COMMITTEE.

The report of the Nominating Committee was read and adopted. The list of officers will be found on page 74. The report also contained the following tribute to a veteran dairyman: "Your Committee believing that the Western Ontario Dairymen's Association has been brought to its present prosperous and useful position very largely through the efforts of one who has devoted the best energies of a long life to the development of the dairy industry of Canada; therefore in partial recognition of the excellent service rendered the dairy interests of Western Ontario, we respectfully beg to recommend that the Hon. Thos. Ballantyne be elected to the office of Honorary President of this Association."

The PRESIDENT: I would like to say in regard to the members of the Board last year that there never was a more faithful Board elected in the history of this Association. All I hope is that the Board of this year will be as faithful and able in the discharge of its duties as the gentlemen who were associated with me last year. I would like to make just one personal reference. When I announced that I would not be President of this Association another year, or rather a candidate for the position, I knew very well who would be my successor.

He then proceeded to pay a high compliment to Mr. McLaren and introduced him to the gathering as its future presiding officer.

Mr. MCLAREN then took the chair amid applause. He said: I thank you very heartily for the high honor you have conferred upon me by placing me at the head of this Association. I appreciate it all the more highly because I am placed in this position in the grand old banner cheese county of Oxford. As you all know I have milked the cow, made cheese, boxed cheese, shipped cheese, bought cheese.

A MEMBER: And judged cheese.

Mr. MCLAREN: I can assure you I appreciate the honor very much. I hope that at the end of my term I shall be able to give a good account of my stewardship. Anyway I shall have tried to do my best. (Applause.)

WINTER BUTTER MAKING.

Mr. J. A. RUDDICK then delivered a short address on "Winter Butter Making." He said that when he was asked to say a few words on the subject of winter butter making it struck him that it was something like carrying coal to Newcastle to speak on that subject in Woodstock, because they all knew it was here that, some four years ago, the first winter creamery in Canada was put into operation. Something had, of course, been done before that, in a private way, in making butter in the winter time, but that was really the first start that was made in reference to winter butter making as they understood it at the present time. Considerable progress had been made, and from what was looked upon as an experiment they had now a big business. In the fall of 1891 there was a great deal of doubt in the minds of many people as to what the outcome would be. However, the experience of the past three or four years went to show that they could at least make an article of butter in the winter which would be superior to the summer butter that had been made before that time. While they had some disadvantages to contend with in the winter time the summer maker had some disadvantages to contend with also, and there were some things, principally that of temperature, which were more favorable in the winter time than in the summer. They were able now to make better butter in the winter than they were at first. The milk was better cared for. As years went by there was more of the fresh milk brought into

the creameries in the winter and a very much superior article of butter had resulted from that cause alone. Some had looked upon it as an encroachment upon the business of cheese-making, and had feared that it was opposed to the interests of cheese-makers. He failed to see any truth in that argument. As a practical maker he believed that the cheese-makers derived considerable benefit at the factories where butter was made in the winter time. Winter butter making led to a more uniform quality in the milk. The cows, in order to produce milk in the winter time, were fed better, and thus the cheese-makers were able to make better cheese earlier in the year than they could formerly. Then again they were able to make butter at that time of year when it was hard to make a decent cheese. This winter he had had charge of the Dairy School at Kingston. They were running a butter factory alongside the cheese factory for two months, and they had found that they could make better butter, comparatively speaking, than they could make cheese in the winter months. He did not intend to go into the details of making butter; it would take up too much time; but there was just one idea in the matter of organization that he thought might be useful. He had felt for some time that the best way in which this winter butter-making might be carried on in a great many places was by establishing independent creameries for the winter He happened to know of one that was being operated on these lines this winter. It was in eastern Ontario, at a place near Brockville—a place where dairying was carried on very extensively. There were two large cheese factories within gunshot of each other. He was very glad to say that the patrons of these two factories, who had been opposed to each other for many years, had come together and organized themselves into a company to make butter in the winter time, bringing the milk to one building equipped with special appliances. The butter business was run entirely independent of the cheese business. In that way they overcame considerable trouble in the matter of local jealousies. In a great many sections butter-making apparatus had been put into cheese factories simply for the purpose of holding the patrons, and when only a small amount of butter was made it came very expensive. By combining, the cost of production was cheapened. No better place for the eslablishment of a winter creamery could be found than right in the centre of some of the large towns in Western Ontario. When the Dairy School was started in the centre of the city of Kingston, it was thought a queer place to put a factory—a queer place to receive the milk. Well they are receiving now between 25,000 and 30,000 pounds a week. That was as much as they required. The milk was brought in from long distances, but the farmers had to come into town any way, and they did not mind the trip at all. It is a fact that if the school had been situated two or three miles out of the city they could not have got one quarter of the milk that they do now. He believed that the plan adopted at first, and followed out in many instances, of making butter in the cheese-making room, was a very good one at the start. It enabled the directors or managers to introduce butter making where, if they had to put up a separate building, it would have been difficult to get the matter under way; but where it was possible he thought it was much better to have a separate room for the butter making. It saved a great deal of labor in the spring and fall of shifting the apparatus, and there was a temporary arrangement in a place of that kind that prevented proper making. He thought it would pay in most cases to have a separate room for making butter in the winter time. It should be warm. A great many of the factories, especially the older ones, would not be warm enough for winter butter making—they were so cold it was impossible to keep the appliances dry and the machinery was ruined more or less, on account of the moisture. It was often easier to put up a small room than it was to fit up the cheese-making room and keep it warm. Rubber belting was much better than leather belting where there was much moisture, and it cost less.

Mr. BALLANTYNE, on being called on, said they must not believe that if they went into winter dairying on an extensive scale they were going to get the high and remunerative prices that they once got. The conditions had changed. As long as the supply was not in excess of the demand they get remunerative prices, but the moment there was a surplus, prices were cut down. They must not forget that the drought in Australia and

New Zealand, and the diminished shipments from this country, were possibly largely the cause of the higher prices to-day in England than they were last year. If there had been the usual make in Australia he would not pretend to say what the prices would have been. The Dairy Commissioner had bought butter at twenty cents a pound, and the gentleman at the head of the Agricultural Department had said that they had made a profit. Such a thing was impossible, no matter what the quality was. He pointed out that a great deal of the winter butter would be arriving in England when butter was going in at the very lowest prices. If they were going into winter dairying they must discontinue feeding turnips entirely. Mangels did not affect the quality of the milk, and they could be raised just as easily as turnips. In everything they did they should bear it clearly in mind to do the best they could. They should not think of making money; if they did their best the money would make itself. He did not boast of being wealthy, and he was not, but if he had been at all successful in connection with the cheese factory business it had been through following that rule—never asking whether it would pay or not pay. He hoped every farmer would do everything to deliver the milk at the factory in the best possible condition. They wanted to be particular with cheese, but it was twice as necessary in the case of butter. In England they would not take inferior butter at any price; they preferred the margarine mixture. Regarding packages, the old tubs were not in demand; they looked too much like lard. The best package in which to ship was a box to hold fifty-six pounds, soaked in brine and lined with parchment paper, also soaked in brine. The two best markets were Manchester and London. Manchester wanted no color. They would take it as pale as it could be got. No market in England wanted the color that the Canadian trade required. In conclusion, he said he was aware everyone was taking to winter dairying, but they must not think they were going to get the prices that used to be paid.

DAIRY FARMING UP TO DATE.

Dr. MILLS, of the Ontario Agricultural College, was asked to say a few words. He was glad to have an opportunity to say a word or two to this very large and interesting convention, representing so important an industry in our Province. The conditions were changed he was sorry to say; prices were down and, he was afraid, likely to stay down. He did not know what Mr. Ballantyne would be able to do for them but he was afraid they would not have so high prices as they had in the past because all the world seemed to be anxiously laboring to produce more cheese and more butter—better cheese and better butter. He did not think they could expect to have the prices that they had had for years past in this Province. The question was "How shall we meet the changed conditions?" He supposed they were all thinking over that very question, and it was not for a man like him to make suggestions, but it appeared to him that one of the most important means of meeting these changed conditions was by keeping better cows. He did not know whether they had the best cows it was possible to get in the County of Oxford, but there was certainly room for a change in many parts of the Province. He did not mean change of breed. He did not think it made so much difference about the breed; it was the care with which they culled them and the persistency and the care with which they fed them from year to year that was so important. They knew there was a vast amount of time and money and opportunity wasted in this Province in having beef cattle for the production of milk. It came to this: If they were going to keep better cows they must get some means of keeping a record of what their cows were doing. All prominent dairymen ought to get a small Babcock tester and learn how to use it. A great many farmers did not know how much their cows were giving; they could test the quantity but they could not test the quality. The dairymen must test the milk in order that that they might be induced to dispose of those beef cattle that they were taking care of from year to year for the production of milk. In the second place they must have better provision for the feeding of

their cows. They knew all that had been said about the necessity of making some suitable arrangement for feeding their cows in July and August. They had been trying at Guelph a great many experiments to see what mixture would give the best result. Their experimenter so far had found that the best mixture to come in between the clover and the corn was pease and oats. Thirdly, the farmers must send their boys and girls to one of the dairy schools. They had a central Dairy School at Guelph, an eastern one at Kingston, and a western one at Strathroy. The Government had made ample provision for instruction in everything pertaining to the handling of milk, the making of butter and cheese and there was every opportunity for young men and young women to learn all there was to be learned about these subjects. The time of year when these schools were running was just the time when farmers could best spare their boys and girls. At Guelph they gave long courses, at Kingston short courses, and they were going to give short ones at Strathroy. The charges did not amount to anything. Fourthly, if they were going to succeed they must pay close attention to business. Was it necessary to say anything to farmers under that head? He ventured to say it was. He would not say so if he did not know something about farmers. Competitition was now, as they knew, very keen, and no one had any chance of success unless by the closest attention to business. He would say to the young farmers especially, who spend much time about the corners or in villages loitering around, that they need not possibly expect to succeed. He had been greatly struck by the accuracy and thoroughness of Mr. Louis' knowledge about pigs, and he held that gentleman up as an example. The successful men in every profession or trade were attending to their business morning, noon and night, and unless the farmers did the same they never would be succassful.

On the motion of Mr. PEARCE, seconded by Mr. EAGLE, a resolution thanking Mr. Andrew Pattullo for his able services as President for two years was unanimously carried.

Mr. MACLAREN remarked that the Association had never had during the twenty years of its existence a more able President.

Mr. PATTULLO responded in a neatly worded brief speech.

The Convention then adjourned.

THE BANQUET.

The delegates to the Convention were tendered a banquet in the Opera House by the Woodstock Board of Trade. President McIntosh, of that body, occupied the chair, and Sir Oliver Mowat and several hundred citizens and cheese-men were in attendance. The banquet was one of the most successful that has been held.

CREAMERIES' ASSOCIATION OF ONTARIO

OFFICERS FOR 1896.

President	D. DERBYSHIRE, Brockville.
1st Vice-President	WM. HALLIDAY, Chesley.
2nd Vice-President	THOMAS J. MILLAR, Spencerville.
Secretary	MARK SPRAGUE, Ameliasburg.
Treasurer	R. J. GRAHAM, Belleville.

Directors:

Division No. 1	J. H. CROIL, Aultsville.
Division No. 2	A. CAMPBELL, Ormond.
Division No. 3	CHAS. JOHNSON, Athens.
Division No. 4	JOHN SPRAGUE, Ameliasburg.
Division No. 5	A. A. WRIGHT, Renfrew.
Division No. 6	F. L. GREEN, Greenwood.
Division No. 7	JOHN S. PEARCE, London.
Division No. 8	W. G. WALTON, Hamilton.
Division No. 9	A. Q. ROBIER, Exeter;
Division No. 10	A. WENGER, Ayton.
Division No. 11	JAMES STRUTHERS, Owen Sound.
Division No. 12	JAMES CARMICHALL, Arva.
Division No. 13	JOHN ZINKANN, Wellesley.

Auditors	A. F. MEACHAM, Cornwall. R. G. MURPHY, Elgin.

ELEVENTH ANNUAL MEETING

OF THE

CREAMERIES' ASSOCIATION OF ONTARIO.

FIRST DAY—MORNING SESSION.

The eleventh annual convention of the Creameries' Association of Ontario opened in the Music Hall, Cornwall, on the forenoon of January 14th, 1896.

Mr. A. F. MULHERN, the Mayor of Cornwall, having been called to the chair, Mr. D. DERBYSHIRE, of Brockville, President of the Association, delivered the following address :

PRESIDENT'S ADDRESS.

It is with satisfaction that I now open the eleventh annual convention of this Association in this grand old town of Cornwall, so beautifully situated on the banks of the ever famous St. Lawrence. As the chief town in these eastern counties, you have exerted a wide influence as a manufacturing centre. Your schools and churches are all that could be desired, your business men energetic, and I feel sure that a grand future is assured to your good town and its people. I thank you, sir, on behalf of this Association, for your generous reception. Your press and citizens have acted nobly, and I am sure we will have a very useful meeting.

Dairying still continues to be the most important industry in our country, and while the prices realized this season have not been as high as last, still we have received $300,000 more from creamery butter. The butter trade has furnished a certain amount of encouragement—in fact it has more than doubled its dimensions this season. And the best of all is we have greatly improved the quality of our Canadian creamery butter ; and while our shipments to the Mother Country have more than doubled this last season, our home consumption has more than doubled also. I feel particularly proud of this, as the work of this Association has been specially directed in educating our own people, as well as our friends abroad, as to the excellent quality of our Canadian creamery butter. It is perfectly wonderful how fast our own people are being educated to a knowledge of what fancy goods really are, and we will continue to persevere with better methods, better apparatus, better educated butter-makers and better milk producers, until every consumer, both at home and abroad, will have nothing but our finest goods.

I would specially urge all our dairymen to the great importance of cheaper production as a means of our ultimate victory in the world's markets. We must have a longer season of production by co-operative methods, making only the finest quality of goods, which will give us the assurance of a permanent demand. Let us push for recognition

both at home and abroad. We must have everyone connected with our business set about a lasting improvement in methods. If we can depend on this we will all have the satisfaction of seeing greater advancement in 1896 than any single year in our history. This certainly is our plain duty.

Besides holding our annual convention at Chesley, we have held several district meetings in various sections of the Province at which great interest was manifested. We gave money grants to the Provincial Dairy Show at Gananoque, the Industrial at Toronto, the Western at London, and the Central Canada at Ottawa, with good results, but I firmly believe we had better concentrate our efforts on one attractive and stimulating exhibition of our finest creamery butter the coming season. Our instructor, Mr. Sprague, has been untiring in his work, and no one can estimate the good he has accomplished. By all these agencies we have fostered the creamery business in summer, and directed dairymen to the advantages to be gained by adding the manufacture of butter during the winter to their summer practice.

There is a movement in some quarters to do away with this organization and have the work carried on by the other two Associations, but I feel that in these days of keen competition we require this Association, specially charged with the building up and enlargement of this special industry.

We feel thankful to the Hon. Mr. Dryden for words of encouragement and assistance in every way during the last year. We are delighted that he has taken such a live interest in the education of our butter-makers. Every dairyman in this fair land can point with pride to our dairy schools. No school on the continent is as well equipped for giving a thorough dairy education as Guelph. Our Kingston dairy school is doing splendid work, and the hon. the Minister of Agriculture is building another dairy school at Strathroy. Surely we must all feel proud of the special attention the dairymen are receiving.

The Dominion Government have been active in assisting to place our Canadian creamery butter on the British market fresh, and the facilities provided for the transmissal of butter to England were beneficial. There is room for still further improvement, however, and it is hoped that the expansion of this branch of our dairy industry will be such as will warrant the Agricultural Department of our Dominion in making still further improvements.

We want all our dairymen to notice particularly what both the Ontario and Dominion governments are doing for us. I feel sure we must all admit that they are doing all they can to encourage us, but it is for us to examine ourselves, our stock, our buildings, our food for our stock, and see if we are really doing all we can for ourselves. If we have not made money this last season, why? I know personally that a large number have, and further I know that a larger number have not, and I would like to urge you all to commence vigorously to improve your stock and everything in connection with your farms. Do not fail to weed out the poor cows, grow corn, build a silo, raise more pork in connection with your dairy, for nothing is more profitable. What can I say more? Loyalty to family and country demands your best efforts, and I believe you will commence at once to better your condition.

I thank the Board of Directors, officers, and all who have assisted this Association the past year. I specially thank Prof. Robertson for his constant and timely assistance, and the press for their assistance, which has been freely given. We cannot over-estimate the value of the press. (Applause.)

COMMITTEES.

I would recommend the appointment of the following committees:

Business—Mayor Mulhern, Messrs. D. M. Macpherson, M.P.P., Wm. Halliday.

Finance—Messrs. Sprague, Wenger, and Zinkann.

Nominations—Messrs. Wenger, Miller, Walton and Graham.

Resolutions—Prof. Robertson, Messrs. Croil, Walton and Johnson.

Legislation—Prof. James, Deputy Minister of Agriculture; Messrs. D. M. Macpherson, M.P.P.; John H. Croil, A. Wenger.

THE ADDRESS DISCUSSED.

Mr. J. S. PEARCE, London, being called upon, said: I am sure there is a great deal for this Association yet to do. The President mentions the idea of holding an exhibition of creamery butter in connection with either one of the larger fall fairs of the Province, or in connection with all of them, as we may think best. That is a good idea, but I would like to go a little further and add to such an exhibition, lectures if possible, by some experts, and object lessons as to the different qualities of butter and their points. I think there is nothing equal to an object lesson, and if this idea could be carried out along with an exhibition of butter it would do a great deal of good. I have often thought that if the Western and Eastern Dairy Associations together should get some really fine fancy cheese that were a year old and cut them up and hand them around to those present at our exhibitions it would be a grand education to our young men, showing what a really fine cheese is like when, say, twelve months old. We had a grand object lesson in that line at Chicago, where we had cheese cut up that were two years old. Of course we could not do that with butter, but, I think, having such men as Prof. Robertson and other experts present to show the qualities of butter, along with an exhibit, and to deliver short lectures, would add very much to the interest and value of the exhibition. With reference to the work of the Creameries' Association, we all know pretty well what has been going on. Still there is plenty of work yet to be done, and the next step is to go out to the patrons and get them to take more interest in the creamery business than they have taken yet. The quality of butter depends very much on the quality of milk sent to a creamery, and if the quality of the milk is improved the quality of the butter will improve in the same ratio.

The PRESIDENT: There has been a movement on foot to do away with this Association and have the work carried on by the other two Associations. I think that, taking into consideration the keen competition we have in all branches of industry, the butter business requires the special attention of this Association. You remember that when the cheese men did run the butter business they devoted all their time to cheese and just "smiled" on butter. (Laughter.)

Mr. J. H. CROIL, Aultsville, being called on, said: I may say that I agree with the remarks of the President, with the exception of his suggestion to concentrate the money for prizes at one point. I think that is something that is open to discussion. We have now worked up very good exhibits every year at Ottawa, and, I believe, also at London. I think last year we had just as good an exhibit at Ottawa as at Toronto, which was not the case some few years ago, when the money was all given to Toronto and London. I am sure if it is considered by the rest of the directors wise to take the course proposed I would go with them. Still, I think it is open to question whether that is advisable. As to the question of amalgamation with the Eastern and Western

Associations, I think there is no doubt about there being plenty of work for the Creameries' Association to do. They are doing a good work in the country, and one that is much needed.

Mr. A. A. WRIGHT, Renfrew, was next called. He said: There are one or two points in the address I would like to speak upon, and about which I can speak intelligently. One thing in particular is with reference to the dairy schools. I think these schools are carried on at the wrong time of the year altogether. In the winter the milk comes in in good condition—it is always sweet at that time of the year. Then at the dairy school there is an expert to take charge of the machine; but when the graduate comes to take hold of a skimming station himself and everything is in a hurly-burly, and he has not only to take charge of the separator but to take in the milk and weigh it and use the Babcock test, and the milk gets sour and he runs it into the separator and the separator gets clogged and a hundred and one other things happen which require attention—these are things he has learned little or nothing about at the dairy school. I think the two weeks term should be increased to three months, and that every man who gets a certificate should first go to some central factory and learn everything that is being done there. With reference to this matter of an exhibition, there is an old saying that anything which is worth doing is worth doing well. If we are to make an exhibit, I believe we should make a good one. Still, whether it is advisable to divide the prizes between three places, or make one grand exhibition, I am unable to say. As to this idea of doing away with the Creamery Association, I want to tell you that as creamery men we are not going to take a back seat. (Applause.) Because the cheese men have reached the pinnacle of fame and we are down, that is no reason why we should be kept down. We are the giants of the future, though at present we are weak and must have assistance. I consider the Association is doing good work, and the creameries are doing magnificent work, and the day is coming when we shall be heard with no uncertain sound. Another point the President has brought up is with reference to the cheese factories making butter in the winter time. I do not know whether you will all agree with me or not, but I do think that is the right thing to do. Now, it is an easy thing to get half a dozen magnificent cheese makers, but it is a most difficult thing to get 600 young men to make nice butter. What is the use of 600 men making butter in cheese factories in winter when six men will do it at large central factories far more easily? What is the reason for having 600 men to peddle butter all over the country when six men can do it infinitely better? I think the proper way is for every cheese factory to put in a separator, skim the milk there and then take the cream to one large central factory to be made into butter. In this way there will be less expense attending the manufacturing of it, the moving of it, and everything else in connection with it, and there will be none of this business of one man selling at eighteen cents and another at twenty cents, and so on. Do not dream of letting anyone take away the Creameries' Association. If any man attempts to put his hand on it let us stand up in our might and, like Artemus Ward, say "Why is this thing thusly?" (Laughter and applause.)

Mr. A. F. MULHERN, the Mayor of Cornwall, said: I think there is no class of men who should be treated with the same consideration as the dairymen. I consider that you are engaged in promoting interests which are most vital to the prosperity of the country—that is the agricultural interests. You are particularly interested in the production of butter, and if you will look at the returns you will find that the export of butter is gradually doubling up. That is being brought about largely by your Association. Nature has done for Canada all which enables it to produce butter and cheese superior to that of any country in the world. It only requires an intelligent application of labor to secure the best results, and it is your Association that is educating the farmers up to this point. I regret that there are not more farmers from the immediate vicinity of Cornwall present here to-day. I think in the neighborhood of Cornwall they are rather lax in taking advantage of such gatherings to better their condition, and are prepared to blame everybody rather than themselves because their condition is not better than it is. I know it will afford me a great deal of pleasure to attend your meetings and lend any assistance I can, because I recognize in agriculture the fountain head of all the prosperity in our

country, and it is your work to formulate methods whereby one great branch of the industry may be carried on more successfully. (Applause.) One of the suggestions made by the gentleman beside me, which I thought a very good one, was with reference to the young men who go to theoretical dairy schools. The young man who wants to be qualified to follow the business, I think, should be taken to one of the hardest factories possible, so that he would come in contact with every atom of the practical work. Another mistake would be to give way to any other organization. You are the people who are doing the missionary work, educating the people in butter making, and, I think, it would be fatal to relinquish it.

The PRESIDENT: Of course there may be misconception. These dairy schools are not supposed to take in green men. They are supposed to be skilled men who go there to widen their knowledge. It is not expected that a young man should go there who has not had charge of a factory, and is not qualified to operate it. Of course a great many have gone who are not qualified in this way, but it should not be so. The students are supposed to attend the dairy school, just as teachers go to the Normal School, to qualify. After intending teachers gain all the information which they can acquire at a school, they go to the Normal School to learn how to apply it, and it is just the same with reference to butter-makers who attend the Dairy School. Now, we have no idea of dropping out of business as an Association. We are here to stay, because I believe the work we are doing is being done as no other association could do it. During the Industrial Exhibition at Toronto the directors of the three associations had a meeting jointly. One of the special objects of the meeting was to pass resolutions with reference to the adulteration of foods, which the English papers thought had taken place in Canada. We passed resolutions that not one pound of adulterated cheese or creamery butter was made in Canada, and could not possibly be made under the laws of the Dominion. Then a discussion arose as to whether we should form the three associations into two, as butter was now made in cheese factories in winter. In view of this I thought it was only proper that the matter should be brought before this Association, and that you should know of this discussion. Of course this is the first opportunity I have had of bringing it before the Association. I feel that we have work to do as an Association, and that we ought to be alive and do more work than the other two Associations, and in this way make our influence felt to a greater extent than any other organization in this country. (Applause.)

Mr. A. A. WRIGHT, Renfrew: I do not wish the idea to go abroad that I was trying to find fault with these dairy schools. I wish to say that they have done a grand work, although they have not done it nearly so well as they would like to see it done themselves. I only wanted to suggest some points whereby their work can be improved.

The convention then adjourned to enable such members as desired to avail themselves of an invitation extended by the citizens to visit some of the large factories of the town.

FIRST DAY—AFTERNOON SESSION.

The convention resumed at 2 o'clock.

HOW TO IMPROVE THE DAIRY INDUSTRY.

Mr. A. A. WRIGHT, of Renfrew, read the following paper on the above subject: I fully recognize the fact that "there are many roads leading to Rome," and of course you will not expect that I should travel over all of these, but just such as in my mind seems to be the preferable ones.

To begin, I shall merely state that in the dairying ranks there are three great subdivisions, or sections, which are immediately interested or affected, viz., the producer, the manufacturer and the purchaser, or purchaser and consumer, as the case may be. In

order that our dairy industry may be a complete success, it must be made profitable and desirable to each one of these interested factors. Smith and Jones will not continue to trade together or exchange products any longer than they find that it is mutually profitable to do so. The dairyman will not care to continue long in the production and hauling of milk to the creamery, unless his cash returns are such as will warrant him in doing so. But should he find it profitable and remunerative, he will then bend all his talents and energies in that direction. On the other hand, should the dairyman fail to deliver to the manufacturer good, wholesome raw material in the shape of milk, then the manufacturer will not care to remain in the business. So also with the consumers; unless they can be furnished with the best manufactured product at a minimum of cost, they too will seek business relations elsewhere.

Please notice how intimately these three are connected, and how absolutely necessary it is that the one should be satisfied with the dealings of the other. Notice also that it is the middleman or manufacturer who has the most difficult part to perform, for he has to please not only the dairyman or producer, but also the purchaser and consumer as well.

Now, let us begin at the beginning. Let us take up the case of the dairyman. How can we convince him that it will be profitable for him to embark, or, if already commenced, how convince him that it is to his advantage to continue in this business? What then are the conditions under which the dairyman can best produce a good, cheap, merchantable article, and at the same time make it a remunerative employment?

Please notice here, that the farmer is not going to the butter-maker to furnish him with all the information possible to assist him in the art of manufacturing fine butter or the best manner of selling the same. At least I have never heard of many cases of this kind. On the contrary, it is considered to be the duty of the manufacturer to assist the dairyman in all the various branches of his business.

This being the case, let us go back to the question, "how can we best assist the producer in furnishing an abundance of good raw material?" Here, too, there are several roads leading to Rome, and to one or two of these I shall draw your attention. Two parties can assist in this, one being the Government and the other the factory-men.

The Government can render large assistance, continuing to do as they are doing now, viz., by holding Institute meetings, where topics of interest are discussed by able and practical men, by the distribution of dairy literature, such as the Annual Reports of our various dairymen's associations, and through the bulletins that are issued from time to time from our agricultural colleges and Government Stations. There is just one difficulty about the distribution of this valuable literature, and that is, that only the more progressive farmers receive it. The question is, how are we to get it to the others. This object can be accomplished very largely in this way: Let the owner of every creamery and the owner of every cheese factory send annually into the Government the names and P. O. addresses of every patron whose name is on his books, on the first day of June, and then let all the documents to which I have referred be sent to every single individual regularly that year, through the mail. By this means all sorts and conditions of men will be reached.

And now, as to the duty of the factory-man. I do not know that I am justified in using the word "duty"; perhaps it would be better expressed by describing it as the desirable things for the factory-man to do. His aim must be to convince the dairyman that it is to his interest to produce and bring his raw material to him. The merchant advertises his goods, sends out circulars telling of the bargains he has to offer, and the factory-man, to get customers, must spend time and money as well. First of all, the factory-man must carry on his business in a straightforward and honorable way with his patrons, so that they will have every confidence in his honesty and uprightness. He should lose no opportunity of instructing the farmer as to how he should handle his milk from the time it is drawn from the cow till it is placed in the weigh can. Some factory-men go to the expense of sending to each of their patrons a monthly sheet, neatly printed, and giving short, but clear, instruction on the handling of cows and their milk.

One thing in particular it has always seemed to me that creamery men should do, and that is, to inform the patrons of the great value there is in the bye-product, *i.e.*, the skim milk. Very few, indeed, seem to realize that this bye-product can, in many instances, be made to produce almost as much money as they expend in feeding their cows. To convince them of this it would amply repay any company or factory-owner to every season take two calves, place them in good quarters, as convenient to the factory as cleanliness and other circumstances would allow, and also near the public road, and feed them during the season on skim-milk and provender, keeping a strict account of the cost of the same and letting the patrons and passersby know what they were doing by placing a large placard on the place, containing something like the following :

Look at these calves—they are being raised on skim-milk.
For further information apply at the factory.

The same thing should be done with pigs. Two lots, with two or three in each lot, should be taken, one lot fed on skim-milk alone and the other on skim-milk and provender, the cost of feed and gain in weight being carefully noted, and the actual gain duly reported. A placard similar to the one placed near the calves should be placed near the pigs, so that everyone would receive an object lesson that would not be readily forgotten. This should be carried one step further. All these animals should be taken to the nearest exhibition, duly entered for a prize, and a man stationed near them with printed slips giving full information as to how they were fed, and what they had netted in cash profits, so that all might know the superior advantages our industry had over all others for making additional profits, over and above the money received from the factory owner for the whole milk. Many will think that this is the work of experimental stations, that the Government or wealthy men should do it ; but allow me to tell you that opposition now is sharp and keen in all branches of business, and the man who to-day makes money must lead and not follow, must convince his customers in an unmistakable way that there is no doubt whatever that he is the man they should deal with.

And now, one more word on this relationship, and I will have done. You know it is impossible for a man to walk in the rain without getting wet. You know that the reason why you and I speak English is because we have always lived with English-speaking people. Now, if your patrons are to be advanced dairymen they must associate and talk with advanced dairymen. With this object in view, introduce your patrons to some of the best, most progressive and brainiest dairymen in the land. Try and induce them to associate with them all the year through. "Yes," you say, "that sounds all very well, but how are you going to do it?" On the first day of June in each and every year make out a list containing the name and P. O. address of every patron sending milk to your factory. Send this list to Hoard's *Dairyman*, requesting that a sample copy of this grand, educative paper be sent to them to read. Try and induce them to subscribe, and if you succeed you will then have accomplished all I have spoken concerning associating with advanced dairymen for at least fifty-two weeks in that year, which time should do them an immense amount of good. Now, understand, I am not interested in Hoard's *Dairyman* other than as a subscriber for many years. I don't know ex-Governor Hoard or one of his staff, but I do know that if a dairyman takes his paper and reads it for one year he cannot fail to be a much better dairyman at the close of the year than he was at the beginning.

These are a few of the means the factory man should employ to assist his patrons, and by these means assist himself.

And now as to the part he should perform at his own door, in his factory and around it. Here everything, outside the factory and in, should be scrupulously clean, thus setting a fitting example for the patrons to follow. Only the best help should be employed, and this help should be paid as liberally as the business will allow. You know it is not permitted to any one individual in this world to know everything ; consequently he should endeavor to set apart at least one week each year to visit one or two of the

leading factories—not too far away—in order that he might get new ideas, see new ways of doing work, and thus try to keep abreast of the times. He should pay his patrons by the Babcock test, and thus encourage them to improve their herds, and also convince them of the fallacy of believing in a general-purpose cow.

And now as to the duty of the Government in respect to the factory owner, or manager, as the case may be. A complete list of all the creameries in the Dominion of Canada should be made out annually and a copy sent to every factory, giving the name of the factory, name of the owner or manager, the place where situated, and P. O. address, so that communication could be held between them at any time, and visits made if convenient.

We now have an inspector whose duty it is to go from one factory to another, giving instruction on all points on which it may be needed. But does not this inspector need a little brushing up, too? Doubtless he is an able and efficient officer, but still not even be any more than any one of us "knows it all," if I may be allowed to use that expression. Why, then, should not he be sent by the Government to some of the leading factories in the United States for at least two or three weeks every year—gaining new ideas, seeing more improved machinery—and then, when on his inspecting tour, he could give this information to all with whom he came in contact.

There is one subject which, it has always seemed to me, never has received anything like the attention that it should at the hands of those most interested, and that is, "the proper construction and ventilation of stables." If our farmers are ever to make a success of dairying it must be by carrying it on the year round. To do this they must provide themselves with the proper buildings for housing their cattle. They must be properly constructed, properly ventilated, be supplied with the best cow-fasteners, and have the indispensable silo attached. The question is, "who is to provide such a plan? Whose business is it to do this work?" It might be attained in this way: Let the various dairymen's associations in the Province vote a certain sum to be given as prizes for the best plan of a stable, to hold, say twenty head of cattle. Let there be five prizes, of say $30, $20, $15, $10, $5, respectively. Let the Government issue a bulletin giving plans and descriptions of each, and then have it supplemented with a descriptive chapter of the various kinds of cow-stalls and cow-fastenings. In addition, the Government should then place all this information in the hands of some one man, well qualified to speak on the subject, and furhish him with small models of the various kinds of stalls and ties, and have this man accompany the delegation that is sent out annually to address Farmers' Institutes, and in this way an amount of information could be given that could hardly be obtained in any other way. It is very desirable that a small model of a stable should be made, in which the mode of ventilation would be clearly illustrated, for if there is one thing that is perhaps more desirable than another, it is that this point should be thoroughly understood.

And now one thought more, and that is with reference to our relationship to the consumer. If we are ever to manufacture butter on a large scale and make it profitable, if our butter is eventually to have the same world-wide reputation for excellence and intrinsic value that our cheese product has, we must look to a foreign market. And now the question arises, "how are we to create a demand in England or elsewhere for our product?" This can only be done by placing our best butter on the British market continually, until such time as it is thoroughly known for its superior excellence, and until it is actually wanted and looked for by the consumer. Happily, facilities for exporting our butter, so far as proper cold storage and other requisites for doing so are concerned, have to a certain extent already been provided—but who is to do the exporting? How can it be done so that each will bear his proportionate and equitable share of the introductory work? Let each factory undertake to send forward a certain percentage of its make every fortnight—more, if they saw fit, but never less. Let this be done continuously, sending only the freshest and best made, and it would thus not be long until our product would be thoroughly known in the foreign market.

The Government should provide a man for looking after the proper and careful shipping of these goods, not the selling of them, only the looking after them by the way, and possibly to see that each factory sent forward its due share. Then, when the butter reaches its destination, the Government should provide another man to look after it there, not to sell it but to watch it, see how it sold, report any deficit to the owner and to all interested parties, and thus enable us to at once remedy any defects that would come under his notice. The points to which this agent should give his particular attention would be as to the style of package, the color of the butter, the amount of salt required, the finish of butter on top, the cleanliness of the package in transit, and other matters of a similar kind, that would come under his notice, and, above all things, to see that the agent handling our goods gave them that prominence and that careful and persistent attention that they deserved.

And now the questions arise: Where should our butter be sent, who should handle it where it is sent, and should all the butter sent forward in this way be handled by one man? I am under the impression that some one or two points should be selected, and some one man chosen in each of these points to handle all the butter that would be sent forward for the first year. These points, and the men to whom the product should be sent, should be selected by the shippers, but no person should be bound to send his product to these points, or to the person thus selected, unless he saw fit to do so. But the stated amount should go forward to such points and to such parties as he saw fit. But, it seems to me, that by thus assailing some one or two points in a vigorous and persistent way, that we ought to succeed, and I cannot see why the victory would not eventually be ours, provided we bombarded the fortress with the proper material and kept the ranks well filled up by a continuous and ever-increasing supply of reinforcements in the shape of fresh, sweet, fragrant, gilt-edge Canadian butter. (Applause.)

Mr. D. M. MACPHERSON, M.P.P., Lancaster. Would Mr. Wright please state the result of any tests he has made in feeding pigs and calves on skimmed milk?

Mr. WRIGHT: I have not done anything of that kind, but allow me to tell you I am going to do it—not for fun, but because I think it is going to pay. Our factory has not yet been running a year. Last year I intended to do it before this, but we had more than we could do. We opened seven skimming stations, and had an inexperienced man at one of these stations. But I am not going to wait for the Government to do this work. It was I who started the travelling dairy before the Government took hold of it. I started it in the county of Renfrew, my wife, two experts and myself holding meetings all over the county during one summer, and the next fall I got an ample return in being able to make better butter than ever before. Now I am going to do this very thing that I suggest the Government should do, of making tests in feeding pigs and calves on skimmed milk. I am not going to do it in the dark, but am going to send reports every month to the papers. The one way to succeed is to convince the farmers that they are going to make money out of the business.

Mr. MACPHERSON: In regard to feeding pigs, how would you suggest it to be done?

Mr. WRIGHT: The way I am going to do is to get some farmers to send us the milk to the skimming stations and to furnish me with so many pigs. I will do all the work if they will only furnish the raw material. When the pigs are ready for the market they will be sold, and the money handed over to the owners. I am going to carry this experiment on right beside the public road, and let everybody know just what we are doing.

Mr. MACPHERSON: Will you keep the pigs closed up there?

Mr. WRIGHT: We will have a certain amount of run for them—just as much as I can get. Of course we will not be able to get as much land as we might like. It is going to cost some money, because, for one thing, we will have to provide shelter.

Mr. MACPHERSON: In recommending an agricultural paper, don't you think it would be well to recommend the best Canadian dairy paper?

Mr. WRIGHT: I suppose it would, but I have never seen a paper that would compare with "Hoard's Dairyman." When I wanted a butter maker I did not care whether he was Jew or Gentile. I wanted the best I could get if I had to go to Jerusalem for him. (Laughter.) I did go to the State of New York to get a butter maker, and he is a good one. I do not care whether he is an American or not, so long as he suits my purpose, and it is the same with a dairy paper.

PURE WATER ON THE FARM.

Mr. FRANK T. SHUTT, M.A., Chief Chemist of the Dominion Experimental Farms, Ottawa, was then introduced, and said: We are all agreed, I am sure, that the chief object of this Association is to impart and disseminate knowledge with regard to the dairying industry, and I am very much pleased, as one who has been a constant attendant for the past five years at the conventions of the Ontario Creameries' Association, to see that year by year we have more successful meetings. It is particularly gratifying to me that the President and his colleagues have provided a programme of addresses on this occasion that is eminently practical, and one which, if acted upon by the farmers and dairymen of this district, will do very much to improve their methods in the preparation of their products. More than this, by the publications of the proceedings which have taken place at these conventions, this Association has furnished valuable information to those who were not able to attend. If it were not for a general understanding that in this way the material could be obtained, I imagine there would be a much larger attendance than we have here to-day. I cannot help saying that those farmers and dairymen who can and don't attend these conventions, are blind to their own interests. Those who attend, not only show their appreciation of the work the Governments of our country are doing for agriculture, but also practically demonstrate their belief in the benefits that are to be obtained by listening to the addresses and by taking part in the discussions. I trust that before the convention closes there will be a much larger attendance from the immediate neighborhood, which I know is an excellent one for carrying on the dairying industry.

To-day I shall ask your attention for a short time, while I bring before you a matter directly pertaining to the work you are engaged in—a matter of vital importance in the strictest sense of the word. I am to speak on the question of the necessity of pure water upon our farms. The burden of my story is that neither for ourselves, nor for our animals, nor in the various dairy operations must we use impure and contaminated water. It is true that we in Canada enjoy very many natural advantages —blessings—most of which we are cognizant of and appreciate. There are, however, some which, from the mere fact they are so common, so universal, we have not regarded with the importance that they deserve. We hear a good deal at our conventions respecting the value of various foods for the production of dairy products—with regard to the nutritive value of bran and corn fodder, and so on—and rightly so, but it is very seldom that we have urged upon us, as a matter of health to ourselves and our animals, the necessity of a pure water supply. I take it that this silence is due to the fact that we enjoy in Canada, in almost every part of it, an ample supply of water which, in the first place, is pure. If we lived in a country where water had to be purchased by the pailful, undoubtedly we should consider its quality at greater length; but living, as I have said, in a country well watered, in a country abounding with rivers and lakes, and with a sufficient rainfall over the greater part of it, the question of the purity of the water we use does not seem to occur to us. These must be the reasons for this apathy everywhere apparent on this important question. It is no less necessary and essential to have pure water than it is to have good, wholesome, nutritious food for our cattle. That is a statement which will be endorsed by all who have given this subject any study.

The functions of water in nature are many. Its universal presence alone might assure us of that. If we examine an animal or a plant chemically, we find the greater part of it is made up of water. Take, for instance, a stalk of corn. We find that when almost ripe it contains between seventy and seventy-five pounds of water in every one hundred pounds. Again, all animals, ourselves included, are largely composed of water. The same is true of animal products. Milk, for instance, contains more than eighty-five per cent. of water.

We may, therefore, rightly assume that of all the functions that water performs in nature, we have here one of primary and of paramount importance. Water is necessary to the maintenance of life and the development of plants and animals. We may consider water as the chief agent in the constitution of animals and plants, for conveying nourishment to the parts where it is needed. The first service water does for plants is to render soluble the plant food in the soil. The plant food, to be available, must be in the form of a liquid or a gas, and the constituents in the soil necessary for the maintenance of plant life must first be dissolved. They can then digest and assimilate this food into their tissues. With animals we have a very similar case. The blood is largely made up of water, and contains digested and in liquid form the food we give them. By the action of water and certain secretions the food may be digested and assimilated, and further, by the circulation of the blood it is carried to the different parts of the body where it may be needed. So you see that this function of water as regards animals is a most important and vital one. There must be a sufficiency of water in the first place, or one cannot maintain vegetable or animal life.

I do not purpose to go into any detailed account to-day of how it is that water acts in this way, or how it is absolutely essential for the process of assimilation either in the animal or vegetable kingdom. I wish, however, to-day to bear with some emphasis upon the fact that this water must be, if we wish health and vigor in our animals, and their products to be wholesome, free from pollution.

During the past eight years that the Experimental Farm system has been in vogue, we have at Ottawa made many analyses of waters from farmers' wells, and I regret not to be able to speak with any degree of satisfaction as to the quality of the samples examined. In the report of this year will be found the analyses of nearly one hundred samples sent in by farmers and dairymen throughout Canada, and you will be surprised to notice that only a very small percentage of these have been passed as pure and wholesome supplies. This is a state of affairs that should not be, and I will go further and say, need not be, because the natural water supplies of our country are of the very best quality. They will compare most favorably with the waters of any country of the world. You will see, therefore, that it is only necessary that this water should be protected from the infiltration of polluting matter—in other words, that we should maintain it in its purity.

This is a matter which we, as dairymen, now woefully and, I may say, sinfully neglect. We have regarded anything, I presume, of the character of water as good enough to drink or to use in the dairy. Of course, we have not as individuals the means at home of obtaining a knowledge of the presence of impurities, and so it is, I suppose, that we have gone on in many instances giving to our cattle and using for ourselves, year after year, water containing liquid manure, fluid excreta, which has found its way into the wells. In nine cases out of ten, it is impossible to say by mere casual examination of a water whether it is pure or impure. There are waters sent to me, however, which need no chemical examination. Anyone endowed with the senses of smell and taste, ought to be able to at once diagnose such cases; but such are exceptional cases. There are, on the other hand, many waters sent to us that are bright and brilliant in appearance, which are really reeking with organic filth.

Now, what is the character of this pollution that we want to guard against, and why is it injurious? The contamination is frequently the drainage from the stables or the manure heap—practically the fluid excreta of animals. We must prevent the infiltration of such into our wells. It is most dangerous. It often leads directly to

diseases and ill-health in the farmer's family, and, at any rate, to a lowering of the vitality and vigor in our constitution and that of our animals. It will lead to tainted milk and unwholesome products. Again, this pollution is directly favorable to the growth of those germs which cause disease. Concerning these disease germs, I may have something more to say shortly.

You will all bear me out in saying that in many instances the well is situated in the barnyard or in the stable itself. Where it is in such a position, pollution must sooner or later find its way into the water. That is not where it should be. The material that thus gets into the well contains plant food. It is a fertilizer. Do not give that water to your cattle nor use it yourselves, but put it on your hot beds. The well is often robbing the fields of their fertilizer, and so you lose by this vicious custom in two ways. Everything has its right place, and we ought to realize that, both from a hygienic as well as an economical standpoint, the manure should be in the fields and not in the wells. Let me, then, at the risk of repetition, say that the wells should not be so situated as to be subject to the infiltration of this liquid manure, where they cannot fail to act as cesspools. We have plenty of data to prove that not only illness, but death, in many farmers' houses in this country can be traced to impure well water. Hygienists are at one the world over upon the pernicious, injurious effects upon the system of water contaminated in this way. Indeed, it stands to reason and common sense that that which has passed through the body should not be used again directly.

This pollution then is of the nature of decomposing animal matter. Such contains as an essential element, nitrogen, and, therefore, is particularly susceptible to change. Compounds are formed that undoubtedly are poisonous to the system, thereby rendering the water dangerous to health. But apart from this we know that this decomposing nitrogenous matter is particularly favorable for the development of bacteria or germs. Now all germs are not injurious to health; many of them are beneficial to mankind and especially to agriculturists. There are, however, those which develop within the system typhoid, diphtheria, scarlet fever and other dire diseases. These microscopic plants feed on excrementitious matter, and too often find a home in the farmer's well. How they get there, in many cases, it is not easy to trace. We have a power of resistance against these deadly foes, but we can overtax our immunity. For many years we may be able by a robust constitution to withstand their attacks, but when the system becomes "run down," we fall victims to their fell inroads. It is not wise, therefore, to run the risk. Again, we may be using polluted water for washing milk cans and in the various dairy operations, and thus disseminating disease. Surely we must guard against such a possible evil.

We must recollect then that past immunity does not necessarily imply a pure water supply, and further, that the action of polluted water is often most insidious in its action. There can be little doubt but what many cases of diarrhœa and indigestion are attributable to its effect, and these may be the forerunners of something even worse. I would ask you, therefore, to throw off your apathy in this matter, and find out whether your supply is uncontaminated, for neither yourselves nor your animals can for long withstand the baneful effects.

Now, if I have said enough to convince you of the danger that may lurk in the well, allow me to point out how we may prevent it. First of all, we must not for the sake of convenience, locate our wells in the stable or barnyard. When so situated they must eventually become catch-pits for liquid manures. Even the densest of clay soils after a period become pervious to such drainage, and in light, sandy or gravelly soils the contamination of the well water comes about in a comparatively very short time.

This leads me to speak of another matter closely akin to this. Is there any reason that in order to get to the farm buildings in the spring and autumn it should be necessary to put on long boots to wade through the pools and slush of semi-liquid manure? There is here a direct loss in dollars and cents in fertilizing material—a waste that is preventable. On many farms the most valuable part of the munure is thus lost and little more than straw taken out to the fields. Let us then use plenty of bedding and absorbents

in the buildings and then—if we don't at once take the resulting manure to the field—see to it that the manure pile is protected from the rain. If you will only take better care of the liquid portion of the manure you will be richer farmers. Remember that leached manure is worth but little compared with that which has been well-preserved. Then again consider the convenience and comfort in having clean, dry surroundings and the effect that such would have upon the young people on our farm homesteads. Is it not largely due to the dirty and slipshod ways that are still prevalent that so many farmers' sons now prefer to go into the cities rather than stay at home? Let us then take some pride in our work, keeping the cattle and the buildings and the surroundings clean, and we shall find ourselves rewarded in many ways.

It occurs to me to say that in our deposits of swamp muck we have a valuable absorbent which can be used to advantage in and about the farm buildings. When this material has been air-dried it can hold a large quantity of liquid and, moreover, yields its own plant food in the resultant compost in an available form for plant use. It contains quite a notable amount of nitrogen, which by the subsequent fermentation is converted into soluble forms particularly valuable for crop use.

In conclusion I would say that the Dominion Government is anxious to help you towards obtaining pure water supplies upon your farms by the examination of such samples as may be collected and shipped according to instructions issued by us. If, therefore, you will write to me, a copy of these directions will be sent you, and if faithfully followed, a report will be sent stating the quality of the water.

The PRESIDENT: This subject has been thought, perhaps, the most important that could be brought before this convention. It has been shown in Leeds county, in a case I know of, that sickness is entirely traceable to the water used by the family. I believe if you will examine the wells you will find there is a great quantity of water unfit for human use and consequently unfit for the use of your dairy cows. It is necessary that we have the very best and purest supply of water we can get. Farther, if farmers want their water examined and will write to Mr. Shutt, Chief Chemist, Ottawa, a reply will come back giving you instructions as to how to send your samples.

Mr. J. G. SNETSINGER: How long a distance will liquid manure filter through the ground?

Mr. SHUTT: That is not a question that can be answered in a word. The character of the soil must determine very largely the distance at which a well may be safe from pollution. In a light, sandy soil it is extraordinary the distance it will run. In a heavy soil, of course, it will not travel so quickly. Then, too, it will depend on the amount of liquid manure that is allowed to go to waste. Any soil will become gradually saturated, and if the well is situated in the barnyard the pollution will eventually find its way into it, no matter whether the soil is open or close. The question of keeping the barnyard clean will also affect the purity of water supplies. There is one question I did not, perhaps, sufficiently emphasize, and that is the absolute need of having pure water in our creameries and cheese factories, and for washing out our utensils. If we use water for washing the utensils which is impure, we are running the risk of introducing into the milk disease germs. Consider their size. They are so extremely small that it requires the highest powers of the modern microscope to see them. There may be hundreds of thousands in a square inch of water. Where the cans are cleansed with impure water they become a favorable medium for the dissemination of these germs. The water, therefore, on all farms supplying milk to towns and cities should be subjected to a rigorous examination, and the same examination should be made of wells on farms sending milk to the creamery or cheese factory. I deem this question of such importance that I trust this Association will, ere long, be able to take some definite steps in regard to a systematic inspection of water supplies. We have legislation against the adulteration of milk and other foods, and I take it that this mattter is just as important. I should think it well within the scope of this Society to be able to compel farmers sending milk to factories to have a pure water supply, and, further, restrain those who have not such a supply from sending their milk.

Mr. MANSELL: In the case of a well where there are frogs, would they contaminate the water?

Mr. SHUTT: No; I do not think the frogs themselves would do much harm. I do not, however, think it is desirable to have these.

Mr. MANSELL: I have a log pump, and once in a while have pumped out a dead frog.

Mr. SHUTT: That is a different matter. Once you have decomposing organic matter, as I have already explained, there is immediately a danger to those using the water.

Mr. MANSELL: How will I keep them out of the well?

Mr. SHUTT: I do not know. I presume the well has an imperfect surface protection. If the water is polluted with dead toads or dead mice or rats it is quite possible to clean the well out, and the water may again become pure, but where it is receiving its supply from a polluted source no cleaning of the well will make it pure. In the latter case the well must be abandoned.

Mr. MANSELL: What distance from the well would it be safe to have a cesspool to to take away your kitchen water, the soil being clay?

Mr. SHUTT: If it were a tight cesspool and the drain a good one I could imagine conditions where there would be no contamination. If the cesspool is made of stone and not water-tight there would be infiltration in time if the well is within a short distance.

Mr. MANSELL: For what distance would the pollution filter?

Mr. SHUTT: If the soil were a blue clay it would be some time before it would filter very far, but in a light soil, as I have already stated, it travels both far and quickly.

Mr. MANSELL: Would it be safe to have the well one hundred feet away from the cesspool?

Mr. SHUTT: I could not say without a definite examination of the soil and surroundings. If you have any doubt of the water, send a sample to our laboratories and we will examine it. I would have the water carried off by a tight drain and have the cesspool made of tarred wood. Another source of contamination is slop water thrown out of the back door, when very often the well is not very far away. It is a dirty, filthy habit. If the slop water itself is not sufficient to cause any flow of itself, when the rain comes the pollution is washed down until finally it gets into the well. I think we might easily devise means for preventing this cause of the pollution of wells on our farms.

HOW TO KEEP UP THE FERTILITY OF OUR FARM.

Mr. Wm. BROOKS, Professor of Agriculture, at the Amherst, Mass., Agricultural College, read the following paper on the above subject:

The subject assigned to me is one of the utmost importance, and, like most subjects of that nature, it is an extremely comprehensive one. Its full and exhaustive discussion within the limits of a popular address of such length as this occasion permits is an impossibility. At best I can but give, in outline, a general statement of my views upon this subject, and this I undertake in the hope that it may provoke thought and discussion, and not with the idea that I can or should attempt to tell you exactly what to apply to your individual fields.

Well known as the ordinary significance of the word fertility is, it seems desirable to call attention at the outset to the fact that the conditions contributing to make our lands productive are numerous. It is generally understood that the physical or mechanical conditions of the soil, or to be more precise, its texture, the proportion of fine and coarse particles, its drainage, its capacity to hold capillary water and to favor the rise of water

from below, and its relations with heat have quite as much to do with its productiveness as its chemical composition. Interesting and important as a discussion of such matters might be made, I believe that it was not contemplated by your honorable President in selecting this subject, and accordingly, though I cannot forbear calling your attention to some of the results of the physical analysis of a few typical soils, I shall confine myself chiefly to the consideration of manures and fertilizers in their relations to the important question of how to keep up fertility. It should be remarked, however, in passing, that even these contribute to fertility in many instances by improving the physical condition of the soil. Still I shall be obliged to confine my attention for the most part to a consideration of the use of these materials in its relation to the composition of soils and crops, or in other words, I shall consider the subject chiefly in its chemical and not in its physical relations.

Before entering upon the discussion of this part of my subject I desire to illustrate, by calling attention to the results of the physical analysis of a few soils, the ultimate relation of physical conditions to fertility. The method of analysis followed in obtaining these results, for which I am indebted to Prof. C. W. Wellington, is that proposed by Prof. E. W. Hilgard, of California. The object aimed at is to separate the soil into a number of different grades, according to fineness, and in accomplishing this result water is used. According to Hilgard's method, the soil, from which all stones and pebbles are first removed, is divided into thirteen different grades, respectively denominated coarse and fine grits; coarse, medium, fine and finest sands; dust; coarsest, coarse, medium, fine and finest silt, and clay.

The soils selected for this illustration are the Agawam "plain" land, which is of a very low grade of fertility, and on which crops suffer very seriously in dry weather; the soil of the Hatch experiment station grounds at Amherst, which is fertile and of nearly ideal physical character; and the soil of the diked salt marsh at Marshfield, which is heavy and becomes wet and sodden in wet seasons, and bakes and cracks during drought.

	Agawam Plain. Per cent.	Hatch Exp. Station. Per cent.	Diked Marsh. Per cent.
Coarse grits	2.57	0.00	0.00
Fine grits	13.71	2.26	0.00
Coarse sands	7.43	1.48	0.60
Medium sand	1.65	0.20	1.50
Fine sand	3.54	0.40	0.00
Finest sand	17.00	2.70	1.55
Dust	7.31	30.34	2.08
Coarsest silt	16.41	4.70	5.90
Coarse silt	14.42	25.80	13.91
Medium silt	1.59	5.14	8.60
Fine silt	9.04	19.11	50.48
Finest silt	0.00	0.00	0.00
Clay	4.89	6.70	13.80
	98.83	99.56	98.47
Finest sand or coarser	45.90	7.04	3.65
Dust or finer	53.66	91.79	94.77

The significance of these figures is made more strikingly evident by massing them somewhat. We find by addition that the percentages of materials of the grade of finest sand or coarser are as follows:—Agawam, 45.90; Hatch, 7.04; Marsh, 3.65; of the grade of dust or finer, Agawam, 53.66; Hatch, 91.79; Marsh, 94.77.

In the soil of the Hatch experiment station we have that fortunate blending of materials which secures conditions favorable to agricultural operations, while the other soils represent two other extremes. The Agawam soil has too large a proportion of coarse, the diked marsh too large a proportion of the fine material.

The soil from the Hatch station is one to which it will be found profitable to make large applications of manure or fertilizers, because the physical conditions are such as to allow them to exert their maximum effect. Upon soils of either of the classes represented by the others under consideration the farmer must exercise greater caution, because with unfavorable seasons the results are certain to be poor.

And this leads me to say at this point that while the farmer cannot change, except within narrow limits, the relative proportion of coarse and fine materials in his soil, he can, by intelligent, thorough, and careful culture, do much to insure profitable returns from his use of manures and fertilizers. It is folly to lavish these while witholding the work necessary to insure fine tilth both before planting the seed and during the growth of the crop.

Let it be understood, then, at the outset that one of the most important methods of keeping up the fertility of the soil is by thorough preparation and careful culture. Not only do these insure such physical conditions that manures and fertilizers applied will do their best, but they also favor the action of the beneficial natural agencies which are constantly at work under favorable conditions converting the raw material of the soil into available food for plants. The great importance of this action becomes evident when we consider the chemical composition of the soil.

At this point it is necessary to say, that, in considering the composition of soils, plants, manures and fertilizers, I shall confine my attention to three constituents—nitrogen, phosphoric acid and potash. It is well known that all contain numerous other constituents, such as lime, magnesia, soda, silica, etc., etc., but it being generally admitted that the natural supply of these is so liberal that our crops rarely suffer because of a deficiency of any of them, it seems best to leave them out of consideration, inasmuch as a thoroughly satisfactory treatment of our subject, even thus restricted, is an impossibility in the time available.

In connection with experimental work carried on under my direction during the last six years, and in preparation for the Columbian Exposition, I have had a considerable number of soils from different parts of Massachusetts and of different geological characters subjected to analysis. The partial result of some of this work I desire to bring to your attention—not in percentages, as reported from the laboratory, but worked out in pounds per acre, in which form their significance becomes much more apparent, and for comparison therewith I present similar details for a few prominent field crops. These figures I shall have occasion to use later also in considering the application of manures and fertilizers.

PARTIAL COMPOSITION OF SOILS AND CROPS.

Soils to the Depth of One Foot.	Nitrogen.	Phosphoric acid.	Potash.
	lbs.	lbs.	lbs.
Yarmouth, one acre	5,950	3,500	1,050
Freetown, "	5,950	3,500	700
Hadley, "	7,700	5,250	1,750
Amherst, " 10 inches	6,356	8,611	10,556
Agawam, " 6 "	1,295	1,667	3,000
Marshfield, " 6 "	15,322	5,600	5,600
Crops.			
Corn, 100 bushels and stover 3 tons	163	573	107
Potatoes, 300 bushels	37	12	53
Timothy hay, 4 tons	101	37	122
Clover hay, 4 tons	178	36	183

The point to which I now desire to call particular attention is the fact made evident by these figures that, as compared with the amounts removed by even very large crops,

the soil contains an enormous supply of the prominent constituents of plants. Even the poorest of the soils under consideration, the Agawam "plain" land, contains as much nitrogen in the upper six inches as eight enormous crops of corn; as much phosphoric acid as twenty-nine such crops, and as much potash as twenty-eight such crops. Of course we all know that most of this plant-food must be in unavailable forms, for this Agawam "plain" land will not produce even one good crop of corn without manure or fertilizer. We also know that our crops cannot "lick the platter clean," or in other words that, *in order that they may obtain what they need there must be much more than they will take up at hand.*

It does, however, impress me strongly that since there exists, even in the poorest soils, such enormous stores of inert plant-food, it does behoove us as farmers to so manage our lands as to favor in all possible way its conversion into available forms. You have doubtless all heard or read of the famous Englishman, Jethro Tull, who by thorough and frequent working of the soil to a good depth raised better crops of wheat for many successive years upon the same land without manure than his neighbors did with it. Tull followed laborious and painstaking methods of hand work with the spade—methods clearly not adapted to present economical conditions, but whatever the method followed, work upon the soil costs, and it becomes, therefore, an important question to decide as to how far it will pay to attempt to substitute tillage for manures—a question, however, which must be left to individual determination. Thorough drainage, fall plowing, complete aeration and pulverization of the soil before and during the growing season, are, however, means of keeping up fertility, which often receive too little attention.

Difference between Nitrogen and Phosphoric Acid and Potash.

Before taking up the question of the selection and application of manures and fertilizers with a view to increasing or keeping up the fertility of our soils, it is important to understand the wide difference in the extent to which soils are capable of retaining nitrogen, on the one hand, and phosphoric acid and potash on the other. We are indebted largely to the careful and long-continued study of the drainage waters of the experimental acres at Rothamstead for the knowledge that soils have very little capacity to hold the former in its soluble compounds, such as nitric acid and ammonia, while under ordinary conditions they hold very tenaciously both phosphoric acid and potash, whatever the form in which they may be applied. This important difference must be kept in mind in deciding to how great an extent it is desirable to endeavor to increase the store of food in the soil. It is evident that we may safely direct our practice toward this end in so far as phosphoric acid and potash are concerned, for the bank which holds these is "solid," and a working capital is desirable; but with nitrogen we must clearly pursue a different plan. Soluble nitrogen fertilizers, if applied one season in excess of the requirements of the crop, are likely to be lost in the drainage waters of the soil before another crop is planted. To endeavor to accumulate a working nitrogen capital by the application of soluble materials such as nitrate of soda is folly; but such capital is desirable, and its accumulation in the various organic substances such as manures, stubble and roots of grass and clover, green crops to be ploughed under, etc., etc., is good practice.

Green Manuring.

What part, if any, green manuring should occupy in farm practice is a question which many are now asking, and as it is a question of chief importance in its relation to the soil nitrogen, it may well be briefly noticed in this connection. It should be understood, first, that green manuring cannot increase the total of either phosphoric acid or potash in the soil. Whatever of these elements the plant grown as a green manure may contain was taken from the soil, it can come from no other source, and it is simply returned thereto. Neither is the growth of a green crop of any great importance in preventing loss of phosphoric acid or potash by drainage, for, as I have pointed out, the *soil* has the capacity to retain these. Must we then conclude that green manuring is of no benefit in so far as

the elements under consideration are concerned? My answer is, no. The feeding roots of all plants are provided with an acid which enables them to exert a powerful solvent action upon the particles of soil with which they come in contact. The crops suited for green manuring are all especially vigorous growers. Their myriad roots ramify through the soil, dissolving phosphoric acid and potash as they go. These constituents enter into the plants, and when this is turned under to decay they become available to the succeeding crops—more available than are phosphoric acid and potash, still a part of the mineral particles of the soil. Whatever has once been a part of a plant is in condition the more readily to become so again. Thus it will be seen the practice of green manuring ultimately increases the availability of the natural stores of phosphoric acid and potash of the soil.

As regards nitrogen, green manuring may serve two important purposes: it may be made, first, a means of conserving soluble soil nitrogen, and, second, a means of gathering nitrogen from the air and making it a part of the soil capital.

Nitrogen Conservation.

The first of these two effects, nitrogen conservation, is hardly second in importance to the other. In some of the forms in which nitrogen is applied to the soil, *e.g.*, nitrate of soda, it is at once liable to loss by leaching downwards; in most of the other forms in which it is supplied it soon enters into soluble combination and becomes liable to such loss. How to prevent this loss is a question of the first importance. We may not be able to do this altogether, but the most effectual means appears to be to keep the soil full of hungry roots of a growing crop. Wherever the soil is unoccupied, especially in the late summer or autumn, with heavy rains there will be a loss of a soluble nitrogen of the soil which could not occur were the soil occupied with a growing crop, for roots of such a crop would seize upon the soluble nitrogen as fast as produced, it would become a part of the plant—an insoluble part, not again to become soluble until the processes of decay shall break down the new vegetable tissues. Green manuring, then, enables the farmer to conserve soil nitrogen. It enables him, to adopt a simile, to put the soluble nitrates which his effective handmaids, warm air and bacteria, have been producing, under lock and key, and to hold them there during the period—autumn, winter and early spring—when that active thief—heavy rain—is most likely to abscond with them.

My meaning will be clearer if I give an illustration. Indian corn has usually practically finished its growth by the middle of September. It is a crop to which considerable manure is applied, and the nitrogen of this manure is gradually rendered soluble (converted into nitrates) by the agencies at work in the soil during the summer and fall. So long as the corn is growing, its roots stand ready to take these nitrates; but these roots become more inactive at the very time when the rains ordinarily become more abundant, and between this time and winter there are two months during which we are likely to lose nitrates by leaching. To prevent this loss a hardy crop may be sown in the corn—one which will grow until cold weather actually sets in, and the roots of this crop will take up the nitrates. For this purpose I have used white mustard, sown about the first of August. It usually continues to grow until the middle of November. Winter rye may be used for the same purpose provided the land is not to be planted before about the end of May in the following year.

On many farms land is allowed to lie bare for weeks after such crops as early potatoes or rye. This is a bad practice. Something should be kept growing. The disadvantages of allowing weeds to take possession are well known. Plow or harrow and sow on some cheap quick-growing seed to police the field—keeping down marauding weeds and preventing the theft of nitrates. As an important means of keeping up the fertility of our farms I would insist, then, upon the great utility of keeping something (not noxious) always growing in our fields. Whether we should turn under in its entirety the crop grown, or utilize it as feed, is a point which I shall take up later.

Nitrogen Gathering.

We have heard a great deal of late concerning the importance to the farmer of the more extensive cultivation of crops belonging to what the botanists know as the natural order Leguminosæ, among the more important members of which are clovers, peas, beans, vetches, and lupines, because of the ability they have to take most of the nitrogen they require from the air. So far as we now know none of our other important field crops are able to do this. When we remember that nitrogen is the most costly of all the constituents of fertilizers—usually commanding from fourteen to eighteen cents per pound—and that the supply of it in the air, four-fifths of which is nitrogen, is exhaustless, we are able to appreciate the importance of this peculiarity of the members of the clover famity. Time will not allow us to go into details. Suffice it to say that, through the agency of bacteria which develop in little nodules upon their roots, the clovers and their relatives are undoubtedly able to assimilate atmospheric nitrogen. How shall the farmer derive a benefit from this knowledge? Clearly by the more extensive culture of such crops as have this capacity. But this must be done under appropriate conditions, or he will fail to reap the expected advantages. Briefly, the more important of these conditions are: First, well-drained and well-pulverized soil; second, a liberal supply of the mineral elements of plant-food, such as phosphoric acid, potash and lime; third, the presence of the germs of the proper bacteria, and fourth, only a small stock of available soil nitrogen. Only the third and fourth of these, I think, require explanation. The nodules on the roots are the result of the growth of certain microscopic plants (bacteria) in the roots. In the absence of these bacteria the plant is powerless to make use of atmospheric nitrogen The bacteria which develop on the roots of different plants are distinct and different species, they develop from germs or spores. Clover nodule bacteria come from spores of that bacteria; they cannot come from the bean nudule bacteria any more than clover seed can grow from beans. Practically and fortunately clover nodule bacteria are probably found in all soils because clover has been so long cultivated that they have become everywhere disseminated. The same is true of the bacteria developing on the roots of common beans and peas. This is not likely to be the case with the bacteria developing upon the roots of such crops as are new in any particular locality. Thus, for example, the Soya bean upon the grounds of the Storrs' School Experiment Station was a failure—clearly being unable to appropriate nitrogen from the air, until the appropriate bacteria were procured from Amherst, when a seemingly magical change was produced. Attention is called to this fact to emphasize this point—farmers should not be too easily discouraged in their trials of new leguminous crops. They may succeed poorly at first, on account of the comparatively small number of their nodular bacteria present, but may later prove profitable when these bacteria become abundant, as they generally will in the course of a few years.

As a fourth condition to the profitable utilization of the luguminous crops I have indicated that they should be grown on soils containing but a small amount of available nitrogen. It appears to be a a fact that when there is a sufficiency of available nitrogen in the soil, they make little use of that from the air. They can apparently secure the necessary nitrogen from an available store in the soil at less expense of energy than is required to take it from the air, and, if you will allow the expression, they appear to be lazy, like the rest of us, and will not take two steps to get what is at hand after one. We must grow leguminous crops, then, in soils poor in available nitrogen, and should not apply nitrogenous fertilizers to them in any considerable amounts. Beyond a supply sufficient to give these crops a start, nitrogen placed before legumes is practically thrown away.

The withdrawal of nitrogen from the air through the agency of the legumes, may be made an important factor in the maintenance of the fertility of our farms. This is true whether we plow under such crops or feed them, carefully saving and applying the resulting manure, and I regard the latter as generally preferable. Every crop we grow has two values—a food value and a manurial value. Plow the crop in, and we get the entire

manurial value. Feed it wisely, we get the full food value, and, besides, in the excreta four-fifths of the manurial value. Food value and four-fifths of the manurial value, minus the cost of handling crop and manure under conditions prevailing in Massachusetts, will generally be greater than the full manurial value; hence the wisdom of feeding rather than turning under a crop which farm stock would relish. There are, of course, exceptions, but as a general rule I would pasture or cut and feed green crops grown either for nitrogen conservation or as nitrogen gatherers.

It should be remembered, also, that the manurial effect of the roots and stubble of a green crop is also considerable. In the case of red clover, it has been found that we may, under favorable conditions, cut and carry off hay crops which may contain two hundred pounds of nitrogen, and still there will be more nitrogen in the surface soil (including clover roots and stubble) than was present before the clover was planted. This seems very much like "eating one's cake and having it, too."

Manures.

In taking up that part of my subject dealing more particularly with the use of manures and fertilizers as agents for the maintenance of soil fertility—on the whole by far the most important part—it seems appropriate to speak first of manures, as these constitute a home resource upon most of our farms. As farmers, I have no doubt you all appreciate at their full value the various forms of manure, and it may seem in a measure unnecessary to spend valuable time in considering them. Yet, in the hope that my remarks may set some of you to thinking and experimenting, and at the risk of bringing "coals to Newcastle," I propose to offer a few suggestions and remarks upon the saving, handling and use of manures. We sometimes read or hear language which would lead one to think that in the minds of some there exists a notion that there is something of a conflict between manures and fertilizers. This is far from my idea upon this question, and I doubt not most of you will agree with me. It is clearly the part of wisdom first to make the utmost of home resources There may be crops, or there may be soils or fields, for which, under certain circumstances, it is preferable to use fertilizers rather than manures, and, of course, when one must purchase the elements of fertility, it is an important question whether they can be more cheaply obtained in manure or fertilizer, and I believe the decision must usually be in favor of the latter, as I shall presently show; but these facts really indicate no necessary conflict between the two classes of materials. There is clearly room enough for both.

In the remarks that follow, I shall deal principally with manures made from cattle, chiefly milch cows, and I shall refer to this as farmyard manure, as I think is the usual custom. The manure from horses I shall refer to as stable manure; that from sheep and hogs will not be specially referred to.

Manure more Complete than Fertilizer.

At the outset, it must be pointed out that manures are more complete in their composition than fertilizers. They contain all the elements found in plants, while fertilizers, as a rule, do not. Besides the nitrogen, phosphoric acid and potash manures, as has been stated, contain lime, magnesia, soda, silica, chlorine, sulphur, iron, etc. Whether this fact does not render the manure more valuable for continuous use is a question to which I shall later recur.

The values of manures varies with numerous conditions, most important among which are the nature of the food of the animals from which it is made, and the methods of handling and saving. To illustrate these points, I wish to call your attention to a few analytical results.

COMPOSITION OF MANURE.

Locality.	Water.	Nitrogen.	Phos.acid.	Potash.	Pounds per ton.		
	per cent.	per cent.	per cent.	per cent.	Nitrogen.	Phos.acid.	Potash
Amherst (average)	65.9	.454	.333	.569	9.1	6.7	11.2
Hadley	50.6	1.230	.740	1.400	25.6	14.8	28.0
Westfield	78.8	.398	.193	.168	7.9	3.9	3.3
Concord	55.2	.290	.211	.346	5.8	4.2	6.9
Worcester	69.8	.206	.102	132	4.1	2.0	2.6
Average 38 samples	67.3	.477	.32	.41	9.2	6.2	9.8
Liquid manure	96.25	.98	.24	.99	19.6	4.8	17.6

It will be noticed that farmyard manure on the average contains about one-half of one per cent. of nitrogen, one-third of one per cent. of phosphoric acid, and four-tenths of one per cent. of potash. A ton of such manure, therefore, will supply about nine pounds of nitrogen, nearly five pounds of phosphoric acid, and about eight pounds of potash. A cord of farmyard manure weighs upon the average about three tons. The plant-food supplied in one cord, therefore, is about as follows: Nitrogen, twenty-seven pounds; phosphoric acid, fifteen pounds, and potash, twenty-four pounds. A common two-horse cart load weighs usually just about one ton. It will be observed, however, that the analyses vary widely; a few are much better than the average, generally because they are drier, while a number are much poorer, particularly in nitrogen and potash. This inferiority may, in part, be due to differences in feed, but I believe it is in a greater degree the result of imperfect methods of saving and handling.

The figures marked "Amherst" are the average results of the analyses of twelve samples of cellar manure made from the college herd of milch cows. The cellar was well drained so that there was no foreign water, and the bottom was cemented and the walls pointed so that there could have been little or no loss of liquid. It will be noticed that the most important difference between this and the average of all the manures is a considerable larger percentage of potash. This difference we can readily understand when we know that a large part (usually about four-fifths) of the total potash excreted by animals is in the urine, which, under conditions existing on many farms, is allowed in part to run to waste. The results of the analyses of the liquid from the gutter in a cow stable affords evidence of this. This liquid, though ninety-three per cent. water, contains more than twice as much potash as average farm-yard manure. The same results enable us also to understand in part why so many manures are poor in nitrogen. It will be noticed that this liquid manure contains more than twice as high a percentage of this element as average manure. It is so well known that manure suffers loss of nitrogen also through the escape of ammonia into the air when it is allowed to heat in loose piles that we cannot wonder that they are frequently very poor in this element.

My remarks make sufficiently evident, perhaps, the precautions necessary to prevent unnecessary loss in the manure pile. They must be such as to prevent loss of urine, leaching, and rapid fermentation or heating. The first two of these conditions are secured in a perfectly drained and water-tight cellar for the accumulating manure, and third by keeping hogs thereon. These animals will keep the pile so compactly trodden that it will not heat rapidly. Of course the liberal use of absorbents such as dry earth or muck, sawdust, plaster or kainit, may be made to contribute to the desired results.

So far as the amount of labor, and the preservation of the valuable elements in the manure are concerned, this plan, still by far the most common in Massachusetts, leaves little to be desired. But its effect upon the health of the cows in the stable

above and upon the hogs in the cellar itself are such as to lead me to condemn it, at least if the cellar is closed on all sides. The bad consequences of this system can be much lessened by the liberal use of absorbents and chemicals such as plaster and kainit both in the stable and in the cellar, and by the frequent removal of the accumulated manure.

My preference, however, is to keep cattle in a wing connected with the hay barn and without a cellar underneath. The floor should be tight and the drainage from the gutter behind the cattle should be conducted to a water-tight cistern outside. An excavation at the outer end of this wing will permit the backing up of a cart or manure spreader on such a level that the manure can be dumped directly into it from a barrow or overhead trolley car. This plan would doubtless be inconvenient where only a small herd is kept and sometimes impracticable upon a large place. For these reasons I should prefer to provide a shallow cemented basin protected by a shed roof, so that the manure might be allowed to accumulate for a few weeks if desired. When the herd is large, however, the labor in handling manure—and it is this item that makes it cost—can be reduced to the lowest point by the plan of dumping into a cart or manure spreader and then applying directly to the field.

And this leads me to say that I believe most fully in the plan of applying manure to the field as fast as made in so far as this course is practicable. It is difficult to keep it without loss, or injury to the health of our stock. I would generally fall-plow the fields to be manured, and then during the fall and winter months get out and spread the manure as made. The experience and observation of many practicable men have convinced them that this is the best plan. Under this system the soluble constituents of the manure are washed directly into the soil and ammonia is not formed with such rapidity as to be driven into the air in any considerable amount. The manure as it lies upon the surface does not heat, it can hold considerable ammonia, and every rain or melting snow dissolves and carries into the soil what has been formed. It is clearly advisable to apply during the winter to the more level fields but even on those with considerable slope, if plowed across the slope in the fall, there will be little wash. The dressing of manure will help prevent it, as well as to protect the soils of the lighter class from the loss of fine particles by the action of wind.

The portion remaining upon the surface in spring has lost most of its virtue, and it may either be worked in with the harrow or plowed in as circumstances render advisable. It should perhaps be pointed out that a heavy application of manure while the soil is frozen will hinder the coming out of the frost in spring, so that it may be inexpedient to follow this plan where early garden crops are to be raised.

The plan of hauling out the manure during the winter and early spring and putting into large heaps, to be forked over and later spread has little to recommend it to the common farmer. It of course improves the mechanical condition of the manure, but it involves much labor and the pile under ordinary conditions is subject to loss through leaching and fermentation. Let any farmer who has been accustomed to follow this practice, try the plan I recommend and I believe he will become convinced of its superiority.

Use Manure and Fertilizer Together.

Upon most of our Massachusetts farms the supply of manure is insufficient. The majority of farmers use some fertilizer. It is generally wise for the ordinary crops of the farm to use these in connection with each other, rather than separately. The physical effect of the manure is generally desirable and cannot be obtained by the use of fertilizers. It prevents in a measure the cohesion of the particles in heavy clay and thus lessens the probability of baking and cracking, and it seems to increase the capacity of the lighter soils for moisture. The constituents of manure are also in many cases less promptly available than in fertilizers. It is desirable to employ the latter to give the crop a quick start. And finally, the manure is more complete in its composition than the fertilizer. The manure replaces at least in part the soda, magnesia, silica, etc, removed in crops, while most fertilizers do not. We may, it is true, raise crops for many years by supplying the three elements, nitrogen, phorphoric acid and potash (incidentally lime is applied with the phos-

phate). Lawes and Gilbert have raised wheat fifty consecutive years on the same land on ammonia salts, superphosphate and sulphate of potash, and at the present time the yield is nearly as great on this land as on that which has received fourteen tons yearly of farm-yard manure for the same length of time; but the yield on the fertilizer now begins to show a tendency to fall off, and there can be no doubt that the more complete composition of the manure is proving an advantage. Of course in such materials as common salt, sulphate of magnesia, etc., we may replace, if considered desirable, the soda, magnesia, etc., carried off in the crops, but even such replacement would leave us without the physical effect of manure—an effect which we may, it is true, in part secure by turning in a green crop. Under many systems of cropping, however, green manuring is inexpedient.

For potatoes, because this crop is generally cleaner and freer from disease on fertilizers only, I would make an exception to the general rule; and I should also except most of the crops involving much hand labor, such as onions, because there are less weeds where fertilizer alone is applied. In the case of a field lying at a great distance from the barns there is also an evident saving in depending upon fertilizers alone.

Fertilizers.

Having thus stated in outline my idea as to the saving, handling and application of manures, we may take up the consideration of fertilizers as a means of keeping up soil fertility. Under this general name are included a very large number of materials of very diverse characters. You will not expect me to take up each in detail; here as with other parts of my subject I can deal only in outline. It will be an advantage to adopt some classification of fertilizers, and for my present purpose, though not strictly scientific, I shall speak of them under the following heads: phosphates, special fertilizers, and raw materials or chemicals, and the latter will be sub-divided under three heads according to the leading element furnished, viz.: nitrogen, phosphoric acid and potash materials.

Phosphates Generally Called for by Buyers.

I have little doubt many of you, when thinking of purchasing a fertilizer, still, from force of habit, feel inclined to call for a phosphate or superphosphate. This is perhaps natural, for superphosphate was the first manufactured commercial fertilizer, and for many years the only one; and this is my reason for having taken as my general head the term "phosphates." Superphosphate, when first made, was a definite article manufactured from bones. It supplied phosphoric acid and a little nitrogen. Now the term "phosphate" means almost anything. Little by little, as chemistry shed its light upon the subject, and the wider needs of plants became understood, phosphates were amended or improved by the addition of now one ingredient, now another. To-day a phosphate may be a material furnishing phosphoric acid alone. It may furnish either nitrogen or potash in addition, or it may furnish both these with the acid. Of course the guarantee of composition enables the farmer to learn if he will what he is buying; but I regard it as an unfortunate state of affairs that a term such as phosphate should not have a more definite meaning. At present, if one desires to purchase a material furnishing phosphoric acid alone in available form, he must use such term as acid phosphate, plain superphosphate, dissolved boneblack, etc.

Special Fertilizers.

A special fertilizer is one claiming to furnish nitrogen, phosphoric acid and potash in the best proportions and in the best combinations for some particular crop or a few somewhat allied crops. Thus we have special corn fertilizers, potato fertilizers, Onion fertilizers, tobacco fertilizers, etc., etc.; and of most of these we may find a considerable number of brands upon the market. Most of you may be aware that Prof. Levi Stockbridge was the pioneer in the United States in introducing this system of fertilization; and you are equally aware that he has had numerous imitators. This system undoubtedly constituted a distinct advance in the practice of feeding our crops. It was a commendable effort to adapt food to the appetite of the plant. In so far as the system is based on

the composition of the crop to be produced, it cannot be regarded as wholly scientific. The soil as well as the crop should be considered. The soil contributes to the food of the plant and soils naturally vary. The peculiarities of the crop should also be taken into account. Plants differ widely in their ability to forage for themselves. Some are like Devon or Ayrshire cows—able to fatten on scanty pasturage—others, like Shorthorns, require abundance of rich feed at hand. Thus the patato for example is a poor feeder; Indian Corn is a far better forager. The season during which the plant makes its chief growth also affects the necessity of supplying the different elements of food, particularly the nitrogen. The grass crop, for example, does not withdraw from the soil an exceptionally large supply of nitrogen. In four tons of English hay there are 113 pounds; in 100 bushels of corn and three tons of stover there are 163 pounds; yet for the grass it is best to apply considerable nitrogen in available form in early spring, while for corn a large application of available nitrogen is not generally required.

My chief ground of criticism of special fertilizers as we find them, however, is in the fact that their composition is not what it should be. Almost without exception they contain too large a percentage of phosphoric acid, and too little of either nitrogen or potash, or both of these. To obtain as much potash as he requires, he who depends exclusively upon special fertilizers must purchase much more phosphoric acid than is necessary. Permit me to call your attention to figures which illustrate this point.

AVERAGE OF SPECIAL FERTILIZERS.

——	Nitrogen.	Phosphoric acid	Potash.
	per cent.	per cent.	per cent.
21 Potato fertilizers	2.7	10.4	5.7
4 Corn "	2.8	12.4	4.0
4 Grass "	3.9	8.9	4.9

These figures are compiled from the annual report of the Massachusetts Experiment Station for 1894; and every analysis for these crops, except one for potatoes and one for corn, was included. These varied so widely from the others that it was thought best to omit them. From the same report I take the following figures:

RELATIVE PROPORTIONS OF PHOSPHORIC ACID, POTASH AND NITROGEN.

——	Phosphoric acid.	Potash.	Nitrogen.
Mangels	1.0	6.0	2.3
Red Beets	1.0	4.1	3.3
Turnips	1.0	3.9	1.8
Cabbages	1.0	4.1	1.7
Corn (whole plant)	1.0	2.2	2.8
Onions	1.0	2.6	2.1
Potatoes	1.0	3.6	2.1
Potato Tops	1.0	2.7	3.1
Computed by myself.			
Clover Hay	1.0	5.1	4.9
Timothy Hay	1.0	3.3	2.8

I leave it for you to judge whether these figures indicate that special fertilizers are correctly proportioned. In forming a conclusion it is desirable to take into account also the composition of soils, and here I ask your attention to the figures showing partial composition previously given. It will be seen that there is considerable variation. In a number of instances there is much less potash than phosphoric acid ; but in some cases the opposite is true. It should be remembered, however, that these figures do not necessarily indicate the requirements of the soil ; and it so happens that experiments with corn and potatoes upon the Amherst soil and with corn upon the same soil as the Agawam "plain" land at Westfield have demonstrated that potash is the more essential of these two constituents for these two crops.

Experimental Evidence.

And this leads me to say that we are not obliged to depend upon theoretical reasoning to show the greater need af potash on most of our soils and for most crops. Experiments in various parts of New England by many different men have shown this to be the case in the majority of instances. Dr. Goessmann's work indicates it, and in his published writings he advocates it. From his last report I quote the following in relation to garden crops : "A mixture containing the proportion of twenty-five per cent. potassium oxide, twelve per cent. phosphoric acid and twelve per cent. nitrogen deserves a careful trial." I may be pardoned for calling particular attention to some of the more important results of the experiments carried out under my direction during the last six years in various parts of Massachusetts. They indicate in a striking manner the surpassing importance of potash as a fertilizer for corn, potatoes, beans, oats and clover. The greatest number of experiments relate to corn and the average results of twenty-six experiments are as follows :

Increase per acre Produced by Different Elements.

Average of 26 Experiments.	Nitrogen.	Phosphoric acid.	Potash.
Hard Corn	5.24 bush.	2.98 bush.	9.5 Bush.
Stover	379 lbs.	196 lbs.	1,028 lbs.

With rare exceptions the results have been similar to those indicated by these figures, and in a majority of instances still more favorable to the potash, The results for potatoes have been of the same character, but less marked. In the case of clover they have been decidedly in favor of potash. I may remark here, though I shall refer to this again, that for grass nitrogen appears to be the most important. I must not, however, dwell longer on this part of my subject. I have said enough to indicate that I do not believe the best way to keep up the fertility of our farms is to buy and use special fertilizers. Good crops have undoubtedly been raised upon them, but I believe usually at an unnecessarily large expeniture for fertilizer because of the excess of phosphoric acid for which the buyer must pay.

Reasons why Potash is Deficient.

That Potash, more frequently that phosphoric acid, is relatively deficient in soils, is the natural result of known causes. First, most farmers in beginning to use fertilizers employ superphosphates, which contain no potash. Other materials commonly used are fish, bones and Peruvian guano, the first two entirely, the latter being almost totally

deficient in potash. It is true that wood-ashes were somewhat used but the supply was small and the soap-makers often extracted most of the potash. I have shown that the special fertilizers of to-day are most of them rich in phosphoric acid and poor in potash; and many of you are using phosphates entirely. Second, all of our important crops take much more potash than phosphoric acid from the soil. Third, it is the potash, to a far greater extent than the phosphoric acid, which has been subject to loss in our farm-yard and stable manures, because voided in the urine. Fourth, the practice of late so common, of buying concentrated feeds, like bran, cotton seed, linseed, oats, etc., for our cows and horses enhances their richness greatly in phosphoric acid and nitrogen, but not in potash. In view of these facts can it be wondered that our crops generally show a greater benefit from potash than from phosphoric acid application? It should not, of course, be understood that the latter is unnecssary. It is usually required, but not in the proportion in which it exists in special fertilizers.

Advice to Those Using Special Fertilizers.

Many of you will doubtless continue to use special fertilizers. You do not believe that you can study out anything better, or you fear the labor involved in the mixing of the materials. Upon such I would urge an experiment. On part of your field, in addition to your special fertilizer, use some material furnishing additional potash. For all the common crops except potatoes and tobacco this may be the muriate in amounts of from 125 to 200 lbs. per acre; for potatoes use high grade sulphate at about the same rate.

Raw Materials and Chemicals.

Either of the terms "raw materials" or "chemicals," as applies to the numerous substances, most of which furnish but one or two of the important elements of plant food, is in a certain sense inappropriate. Many of them are directly incorporated in mixed fertilizers. They are no more "raw" before mixture than after. Dried blood and dry ground fish are examples. The term "chemical" is appropriately applied, perhaps, to substances liks muriate of potash, sulphate of potash and nitrate of soda, which have been subjected to a chemical process of manufacture before being put upon the market, but these are chemicals precisely to the same extent after mixture in the complete special fertilizer. They do not undergo any further chemical change. They are simply mechanically mixed with other materials. I prefer the term "unmixed fertilizers." All may probably be included under this single head, for all have a fertilizer value. They differ indeed, very widely in their degree of availibility, such for example as leather and apatite. These might properly be called "raw" because it is best to subject them to special treatment before applying them to the land. Others like nitrate of soda and superphosphates are immediately available. Between the two extremes we have every possible degree of availability. I shall consider separately the materials valuable chiefly for nitrogen, for phosphoric acid and for potash.

Nitrogen Fertilizers.

Some of the more important materials which are used chiefly as a source of nitrogen, mentioned in the probable order of their availibility, are nitrate of soda, sulphate of ammonia, dried blood and flesh meal. Besides these there are a number of animal substances rich in nitrogen, but also containing considerable phosphoric acid. The more important are dry ground fish, tankage and bone meal. Cottonseed meal, though less generally used, except by tobacco growers, should also be mentioned. Any of the above materials may sometimes be wisely used by the farmer as a source of nitrogen, and in determining which to purchase, the price of a pound of nitrogen should be one of the leading factors considered. The value to the farmer of a pound of nitrogen in these various materials may not be the same in all. If wisely used the more available are generally the more valuable; but since the more available nitrogenous fertilizers are also

more liable to waste by leaching; this is not an invariable rule. Many would prefer sulphate of ammonia and dried blood to nitrate of soda, because they are less subject to waste. It does not answer to make a heavy application of nitrate of soda in early spring to a slow growing crop. For this reason I generally advise the use of a mixture of materials. Nitrate of soda may be used alone by making several small applications, but it is generally less expensive to make one application of mixed materials. As a means of feeding a crop with nitrogen I would use a mixture of nitrate of soda, dried blood, fish or tankage and bone meal. At present prices, however, it should be remarked that nitrate of soda is one of the cheapest sources of nitrogen in available form.

Other materials furnishing nitrogen, such as horn and hoof waste, wool and hair waste, and leather should be left to the manufacturer. Tneir action is so slow that it is inadvisable for the farmer to purchase them.

Phosphoric Acid Fertilizers.

The most important of these also mentioned in the probable order of their availability, are superphosphates, including dissolved bone black, tankage, dry ground fish, phosphatic slag, bone meal, Florida phosphate, South Carolina phosphate, phosphatic guano and apatite. Cottonseed may also be mentioned as of considerable importance in some localities. Tankage, fish, bone meal and cottonseed meal, it will be remembered, have been mentioned as as also furnishing nitrogen. The others in our list furnish only phosphoric acid. In selectiong from this list, the availibility and the cost of a pound of phosphoric acid should be the points considered. In general the more available the higher the cost. A pound of soluble phosphoric acid in superphosphate costs about six and one-half cents per pound. A pound of acid in a more insoluble form, as in South Carolina rock, can be bought for about three cents. If required for immediate use by the plant the farmer must pay the higher price, but if he can buy and apply in advance of present need, he may effect a saving by buying the cheaper form. Nature will in the course of a few years render it available. Dr. Goessmann's special phosphoric acid experiments are of interest in this connection. Without going into details, I may say that his plan is to apply equal money's worth of phosphoric acid in different materials to plats of land liberally supplied with nitrogen and potash. The materials selected have been dissolved bone-black, South Carolina posphate, Florida rock phosphate, Mona guano and phosphatic slag. According to the system followed, two or three pounds of phosphoric acid in the cheaper natural phosphates have been applied for every one pound in bone-black. This experiment began 1890, the crop being potatoes. The dissolved bone-black gave the largest crop, but was followed closely by the South Carolina phosphate and the phosphatic slag. In 1891, the crop was winter wheat. The South Carolina phosphate, Mona guano and the slag each gave a larger yield than the bone-black, but the latter had considerable more straw than either. In 1892 the crop was Serradella. The plats in order of their yield, beginning with the largest, were: Phosphatic slag, Mona guano, South Carolina phosphate, dissolved bone-black and Florida phosphate. The last named, however, received no phosphate the previous year. In 1893 the crop being corn, the order of yield of grain was: Mona guano, South Carolina phosphate, dissolved bone-black, phosphatic slag and Florida phosphate. Both the slag and the Florida phosphate stood relatively much higher in the yield of stover. During 1894 the field was in barley without further application of phosphates, and the order of yield was: Phosphatic slag, Mona guano, South Carolina phosphate, dissolved bone-black and Florida phosphate. The result is similar to that of the preceeding years.

The essential point to be noticed in connections with these experiments is that while at first the dissolved bone-black gave the largest yield, in the second year even, the cheaper natural phosphates exceed it and have exceeded it every year since. No one will doubt that they will continue to exceed it for several years if the land be left without the further application of phosphates, for they have been used (at the same cost) in two or three times greater amounts.

Potash Fertilizers.

The more important of these are sulphate of potash, muriate of potash, kainit, potassium and magnesium sulphate, and wood ashes, the latter supplying also phosphoric acid. More recently a double carbonate of potash and magnesia is being offered from Germany. It is claimed to be very superior for tobacco and fruit crops. This is the same compound of potash which comprises the most valuable portion of wood ashes. In all of the materials named the potash is quite promptly available; a portion of that in the ashes is the least so. At present prices the muriate of potash is the cheapest source of this constituent in Massachusetts, and it may be safely used for most farm crops. My experience indicates that for the potato the sulphate is superior, producing the larger yield and of superior quality. There is some evidence that the muriate, if applied during the autumn or winter, will answer equally well. I have planned to test this point the coming season. I am aware that many prefer ashes as a source of potash, and it is doubtless true that their physical and chemical effect on many soils give them an advantage. When however, a Massachusetts farmer is looking for a material which will furnish available potash for the least money, he cannot afford to take ashes. The potash in them generally costs about eight or nine cents per pound. In the muriate it can be bought for about four and one-eighth cents per pound.

How to Keep up Fertility with Fertilizers.

In summing up the whole question of the best method of using fertilizers, I have to say that I am strongly impressed with the wisdom of the plan proposed by Wagner, which you will find described at length in a translation by Dr. C. W. Wellington, published in the Msssachusetts Agricultural College Report for 1890.

Stated as briefly as possible the plan is as follows: Since phosphoric acid and potash are retentively held by soils, it is recommended to apply these liberally during a series of years, selecting for this purpose the cheapest forms, with a view to accumulating a reserve or working capital of each. It should be remembered that a very large excess of either may prove injurious. There is, however, little danger that the average man who depends upon the farm for a livelihood will apply enough to be harmful. Continue this liberal yearly application as finances make possible until a simple experiment shows that a further application will produce no increase in the crop. Thereafter from year to year aim to supply a little larger amount of each than the crop receives from the field. This very slight excess may serve to cover any possible loss of any constituent. I would advise the opening of an account with each field. On the one side charge it with the food applied; on the other credit with the plant food recovered in the crop. You will look for a close agreement between the two sides only in the case of phosphoric acid and potash. The nitrogen, you remember, is subject to waste. You think such an account will involve much labor, but you are mistaken. The experiment stations publish already reports which make it simple. The matter can, however, be still further simplified and doubtless will be. Let the station issue tables which show how many pounds of nitrogen, phosphoric acid and potash there are in one hundred pounds of different fertilizers; how many pounds in a cord of manure; how many pounds in one hundred bushels of grain, vegetables, etc., how many in one ton of hay; and knowing what you apply, and the crop harvested, there is not one of you but can fill out the account at a glance. Set your boys and girls to work upon it. It will provoke thought both in them and in you. It will be as serviceable in its field as a cash account in regulating expenses.

I cannot tell you how to make two sides balance. If we knew, farming would be royally profitable. The plant food in one hundred bushels of potatoes can be purchased for about five dollars; and in all other important crops for a figure much below their usual value. There is ample margin to cover interest taxes and labor. It is because we waste so much that our crops are unprofitable. Let us adopt means to know just how much we are throwing away. When we understand in what the leak consists and how great it is, we shall set to work the more earnestly to prevent it.

I would keep the account with nitrogen as well. Here, however, is a leak—toward the sea—that perhaps we shall never be able to entirely prevent. Wagner says that we must expect—even on land where there is an abundance of phosphoric acid and potash—to apply three pounds of nitrogen for every two recovered in the increase of the crop. I hope I shall some day be able to do better. Let us know the exact size of the leak in our farming operations. I fear most of us use more than three for two.

In feeding crops with nitrogen we must always keep in mind that the soil does not long hold this element. This has already been stated but the matter is of much importance. In providing for the crop of any season, combine quick and slow acting materials as a rule; or if you decide upon nitrate of soda apply half at planting, one-fourth when the crop is one-quarter grown, the balance when it is half grown. As for the amount to use, until we learn how to do better, apply one and a half what the increase expected in the crop will remove except for legumes. For these use but very small amount to give them a start. Force them to draw from the air.

General Rules.

For corn, potatoes, clover, peas and beans make potash a prominent constituent of the fertilizer used. For grass and in general all crops which start into growth very early in the spring, use nitrate of soda freely. This is necessary, for the fall and winter rains wash out of the soil most of its available nitrogen compounds. During the warm summer weather, such compounds are formed by natural agencies from the organic matter in the soil and are ready in season to feed a late growing crop like corn. For such a crop therefore, it is unnecessary under ordinary circumstances to apply a large amount of nitrogen.

Phosphoric acid hastens the ripening of most crops, and a liberal use of it may be an advantage where earliness is particularly desired. It is also, according to Wagner, particularly essential for all fodder crops.

Summary.

The leading points that I have endeavored to bring out are the following:

1. The productiveness of the soil depends in no small measure upon its physical character.

2. To secure the conditions essential to the best effects of manures and fertilizers, and to utilize in so far as practicable the natural resources of the soil, which are enormous, good drainage, fall plowing and thorough tillage are essential.

3. Soils can hold phosphoric acid and potash; they do not hold soluble nitrogen. We may wisely endeavor to accumulate a reserve of the two former, but not of the latter except in the form of organic matter.

4. The culture of suitable crops which can grow late in the fall enables us both conserve and gain nitrogen. The latter purpose is well served only by leguminous crops, of which the clovers are the most important. We should aim never to allow fields to lie bare during the season when the ground is open. It often pays better to feed crops grown for this purpose than it does to turn them in. The stubble and roots have a great manurial value.

5. So manage as to prevent loss of urine and ammonia of manures. Apply to the fields when fresh, aiming to reduce the labor of handling it to a minimum.

6. Special fertilizers are not correctly proportioned. They contain relatively too high a proportion of phosphoric acid. If they are to be employed use potash with them.

7. It is generally best to use manures and fertilizers together rather than each by itself.

8. Unmixed fertilizers in great variety can be obtained and by their use, in connection with home-made manures, the farmer can keep up the fertility of his fields at less expense.

9. In the use of phosphoric acid and potash follow the plan of accumulating a large working capital.

10. For phosphoric acid depend chiefly upon cheaper natural phosphates to accomplish this.

11. For potash the cheapest present source is the muriate.

12. In supplying nitrogen use mixed materials of different degrees of availibility, or if choosing to depend on nitrate of soda, apply at two or more different times. Do not apply nitrogen in large excess of the requirements of the crop under cultivation.

13. Open an account with your fields, charging each with the plant food applied, crediting each with the amounts removed in the crops. Try to make the two sides of the account balance. We should be able to do this pretty nearly for the phosphoric acid and potash. We cannot expect so close an agreement for the nitrogen.

In conclusion, I believe in general in broadcast application both of manure and fertilizer, and would keep both near the surface. In some cases, a part of the quick acting fertilizer may with advantage be put in the hill or drill. For potatoes, drill application of all the fertilizer has given a larger yield than broadcast in my experiments. This was upon land of moderate fertility.

For crops in general, materials supplying from forty to sixty pounds of nitrogen, from forty to sixty pounds of phosphoric acid, and from sixty to a hundred pounds of potash will generally give satisfactory results, provided a system of rotation, including some legumes, is followed to furnish a part of the nitrogen. If this is impracticable, considerably more of this element must be furnished.

You have, perhaps, expected that I should give you formulæ for different crops. I do not consider it best to do this. I do not know your soils; I am unfamiliar with your conditions. If you desire to know what I have used and the results I can tell you, but I cannot promise equal success to you.

Just one more point, and I am done. If plant food is to be purchased, my experience leads me to believe that fertilizers will furnish it at less cost than manure. For six years two plats of land have been continuously under the same treatment at our grounds at Amherst. One has received yearly nitrate of soda at the rate of 160 pounds; dissolved bone black, 320 pounds, and muriate of potash, 160 pounds per acre. The other has received yearly five cords of good manure. The crops in the order of succession were corn, corn, oats, grass, grass and corn. The increase in crop due to the use of fertilizers has been worth $124.41; the fertilizer has cost $69.12 for the six years. The increase where the manure has been used has been worth $149.49; the manure, at five dollars per cord, has cost $150. The chief superiority for the manure has been in the grass crops, doubtless because of the more liberal supply of nitrogen. In six years, where the fertilizer has been used, we have applied 120 pounds of nitrogen; where the manure has been used, we have applied not less than 600 pounds of nitrogen. The fertilizer could have been made to make a much better yield of grass by the use of more nitrogen.

On the college farm, I have for five years been comparing various mixtures of fertilizers with manure for grass. The increase in crop pays for a judicious mixture of fertilizer; it has not paid for manure at five dollars per cord.

Mr. MURPHY: Do mangels require a large amount of potash in the soil?

Prof. BROOKS: Yes. The fact is that our fertilizers are not correctly proportioned. There have been many men in New England who, for years, have been urging that fertilizers should contain much more potash and less phosphoric acid than they do. Our manufacturers are slowly changing their practice, but we have not even yet got enough potash in our fertilizers. I am not, myself, much of a believer in a very large use of

these special fertilizers, chiefly because they are not correctly made. They contain too much phosphoric acid; too little potash. I believe in purchasing unmixed materials such as can be bought in all our markets. In this country you have ground apatite or Canadian phosphate, ground bone, dissolved bone-black, plain super-phosphate. I believe in buying these unmixed materials, and putting them together to suit the crop; but, of course, to do that to the best advantage requires considerable knowledge of such matters.

Mr. D. H. McLean: There is a custom of summer fallowing here. Is there a great loss of nitrogen from that practice?

Prof. Brooks: Undoubtedly there is. The practice of summer fallowing is one which was formerly very common. It is a practice which the work of Sir John B. Lawes and Sir Henry Gilbert has done as much to show the disadvantages of as has the work which has been done in any part of the world. You render the plant food in the soil available by this means, but at enormous cost. You render the nitrogen available, and away it goes with the first rain. That is where the cost comes in, and I am sure most close students of this subject are thoroughly convinced that it is best to keep something always growing on the land. The action of the roots upon the soil is to reach out for the nitrogen as fast as it becomes soluble, and then in the late fall you turn it over, and the roots will not rot until spring, when the nitrogen becomes available for your new crop.

Mr. R. J. Graham: There is a practice of turning stubble under immediately after the crop is taken off.

Prof. Brooks: It is a bad practice to leave it bare. I would infinitely sooner turn it over than let it grow weeds which will be a source of future trouble; but it is better to sow some kind of seed to turn under later on. Winter rye is a good crop for the purpose, also rape or white mustard. White mustard does not become a weed. The mustard which you find in your fields is black mustard. I have raised the white mustard for seed, in which case some of it was inevitably scattered, but still it does not become a weed.

Mr. Pearce: Is the seed white?

Prof. Brooks: Yes.

Mr. Pearce: How does it compare with rape for a fall crop?

Prof. Brooks: It is not quite as good.

Mr. Graham: Would it affect the flavor of the milk?

Prof. Brooks: It would:

Mr. Graham: What could we sow that would be perfect and safe for us as dairymen in this respect?

Prof. Brooks: There are various things. You can use rye.

Mr. Graham: It would not make much growth.

Prof. Brooks: Do you propose to plow again in the fall?

Mr. Graham: Yes.

Prof. Brooks: No, it would not make much growth.

Mr. Graham: Our custom is to turn under the stubble.

Prof. Brooks: I would prefer a quick growing plant like mustard. The young stock and sheep are very fond of it.

Mr. Graham: It would spoil the milk for the factories if the cows got on it.

Mr. D. M. Macpherson, M.P.P., Lancaster: How would millet do?

Prof. Brooks: It would do, but would not make much growth.

A Voice: What is the cost of white mustard?

Prof. Brooks: It costs with us about two dollars a bushel—from two to three dollars—but I advise any farmer who proposes to use it for the purpose I have

suggested to raise his own seed. It can be raised at much less expense than it will cost to purchase it. I see no reason why it should not do. It is extremely hardy. It may be sown in corn fields with a view to its growth after the corn is cut, and it has generally continued to be green until about the 5th or 10th of November. It is just about as hardy as the turnip or cabbage, and belongs to the same family. You can sow from twelve quarts to one-half a bushel per acre, according to the richness of the land.

Mr. J. Lockie Wilson: What kind of corn do you prefer for the silo?

Prof. Brooks: We prefer a corn which will nearly mature before frost. We cultivate both flint and dent; among the flints, the Longfellow and Sanford—both are good. We let them grow until the ears become glazed, and then put them in the silo. We do not want more than seventy-six to seventy-eight per cent. of water in the silo. For a Dent variety, Sibley's Pride of the North is good, but there are other farmers who go in for something larger, and take the Leaming field corn. That is a kind that will sometimes ripen with us, but is not a reliable kind for grain. There are some advocates of sweet corn, but on the whole I think it makes a somewhat more acid silage.

Mr. Graham: Suppose you feed it dry?

Prof. Brooks: Sweet corn is undoubtedly better. But you know the ears do not keep very well. They are likely to mould unless you get them well cured.

Mr. Graham: How does it compare with other corn for feeding in the fall?

Prof. Brooks: We like it very much for that purpose, considering it rather better than the ordinary field corn.

Mr. Graham: What time do you put your corn in, and how long has it to mature before you have frost?

Prof. Brooks: We plant it generally from the 5th to the 20th of May, and we ordinarly consider ourselves comparatively safe from frost up to the 10th or 15th of September.

Mr. Graham: Your season is not much, if any, longer than we have hear.

Mr. Milton: Do you approve of this corn dried or cured by the ensilage system?

Prof. Brooks: I much prefer the ensilage system. We have been carefully comparing both methods of feeding, the result showing that there is some loss of feeding value in the dried corn. A loss in this way occurs from exposure to the weather, and a still more serious loss from the fact that the cattle reject a good deal of the plant which is, on analysis, found to be good food. Some loss occurs from fermentation under the silo system, but it is not any greater than the loss from exposure to the weather, from the crumbling which takes place in the fields, and from the rejection of parts of the corn by the animals. In the case of well made ensilage they eat it all.

Mr. Graham: If they should eat all the dried corn would they get as much good from it as from silage?

Prof. Brooks: I do not think they will, because I think the succulence of silage is a point in its favor. I think we may make a comparison like this: Which would you prefer, a nice sweet fresh apple, or a dried apple?

Mr. Brown: What is the value of gas lime as a fertilizer?

Prof. Brooks: Lime in any form is of use in rendering land productive; not, however, because it furnishes something that the soil lacks, but because of its action upon the natural soil constituents. There is truth in the old German proverb that its use "makes rich fathers and poor sons." Why? Its use enables the plants to extract the constituents from the soil to a greater extent than is possible without it. Now as to gas lime. It is lime used for purifying the gas. Quick lime is taken for this purpose, but as it leaves the gas works it is moist and has become slaked and contaminated with impurities and its action is much less energetic than is the action of quick lime. Still it has the same kind of action. It helps you to get out of the soil some of its important constituents.

Mr. Brown: Here we have a gas house, but the gas lime has no admirers among the farmers. In the Old Country, where I lived, they draw it a long way and mix it with night soil and put it on their turnip land.

Prof. BROOKS: I would not mix it with the night soil, for the reason that it will drive off part of the ammonia into the air. I should put gas lime directly onto the land.

Mr. GRAHAM: Do you ever use any salt on the land?

Prof. BROOKS: We do not make much use of salt as a fertilizer except for a few special crops. For mangel wurzels we have sometimes found it very beneficial. The mangel was originally a seaside plant, and seems to require more salt than most plants. I have seen an application of about 300 pounds to the acre increase a crop by quite a number of tons on an acre. Apparently there was no other cause for the increase. We get a good deal of salt now in some of the fertilizers we buy, so that we use it indirectly.

THE ANNUAL BANQUET.

As in the case of other places where the conventions have been held, the citizens of Cornwall marked the Association's visit to their midst by tendering to the visitors a banquet on the evening of the first day. The spacious dining-room of the Rossmore House was comfortably filled on the occasion, by a company who enjoyed themselves to the utmost in discussing first an excellent bill of fare and afterwards the subjects included in a lengthy toast list. Mayor Mulhern occupied the chair.

SECOND DAY—MORNING SESSION.

The convention resumed at 10 a.m., the President in the Chair.

PROPER COW STABLES.

Mr. A. A. WRIGHT, of Renfrew, introduced the question of the proper construction of cow stables. He said: The land feeds the ravens but they have got to scratch for their food, and in like manner we are expected to work for anything we get. Now I want to make use of every man who is here so that I may find out about the different kinds of cow stalls, and I am not going to wait for the Government to help me in this matter. I am bound, so far as I am concerned, to get up a whole set of plans of stables, stalls and cow-ties. The Government and the Association are not going to do it. When I recommended it I knew they would not, but I did it so that it might come up for a memorial against them in future times. (Laughter.) I am told there is a gentleman about a mile from here who has a very fine stable, and an invitation has been extended to any who would like to visit it, to do so, and a bus will leave to take those out who choose to go when the convention adjourns this morning. He thinks far more of his cows than of his horses, and that is right, because a good dairy cow now is worth more than half a dozen horses. If a man is going to bring fine clean milk to the creaming stations the cows have to be kept in stables which are properly ventilated and healthy. I understand the very best ventilated stable in the Province is owned by Mr. Tillson, of Tilsonburg, and if any of you go near there I would advise you to visit it. If anyone knows of a better cow stable anywhere I wish he would drop me a post card, that I may go and see it. After I get all the information I can I am going to let the Creameries' Association have it.

Prof. BROOKS was called to describe the stables at Amhurst, Mass., experimental station, and said: I presume I may not be able to bring to your attention anything superior to what you have in your own country, but it is always of interest and practical value to know what those who live elsewhere are doing. Will Mr. Wright allow me to make one suggestion in connection with the Bidwell stall? I feel certain that if he will write to the makers and explain what he wants they will give him a stall.

Mr. WRIGHT: I did that very thing. The stall is not patented here and they would not do it.

Prof. Brooks: They have given us a stall at the college. That is a good way from here, but if you cannot find one nearer and will come to Amherst, we will be glad to show it to you. However, we have not put the Ridwell stall in our new stables. I have had considerable experience in putting up stalls during the last three years. We began a new barn in 1893 and finished it in 1894. We have stables which will accommodate about one hundred head of cattle—about sixty-five in one stable, and the balance in another. The plan of construction may not be suitable to this country, because I have noticed that most of the farms between Montreal and Cornwall are level. We have put up what is commonly known as a hillside barn, one hundred and sixty feet long by sixty feet in breadth, with one end to the face of the hill. In the basement we have nine feet clear, for implements, above this the main building has posts twenty-three feet in height. The building has a gambrel roof We drive into a floor in the roof to put down the hay, having a sheer fall from the body of the wagon of about twenty-six feet. This makes the storage of the hay very easy, indeed. We do not need a horse fork. It can be pushed right off the waggon with the greatest rapidity. At one side of the main floor, over what we call the hay bay, we have extended the floor to the side of the building. This floor is about twenty feet from the end of the barn. When we have driven in and unloaded we drive to the down-hill end and back the wagon into this space. The wheel is cramped and backed in the opposite direction, and we drive out in the same way we went in. We drive in on the same floor with fodder for the silo as that into which we drive with hay. We cut the fodder on this upper floor and put it into the silo by means of carriers. We have three silos each thirty-two feet deep.

The stable for the cows is in the form of an L or wing on the south side and on a level with main floor of the barn. This wing is forty-two feet wide by one hundred and thirty-five feet long. Its construction is rather new with us From the floor to the roof at the plates is eight feet, and the roof has a slant for about two-thirds of the distance from the outer wall to the ridge and then the wall goes up again six feet, and from this the slant to the ridge is completed. It is what is called a monitor roof. The object of this monitor roof construction is to promote the circulation of air without subjecting the animals to draughts. We have plenty of windows of good size. There is nothing so efficient as sunshine as a germicide to kill the germs of tuberculosis and other diseases. We have windows on each side in the lower part of the wall and also in the upper part of the wall. In the lower windows the bottom sash slides into the wall. The upper sash is hinged at the bottom and turns in at the top. The object of hinging the windows in that way is to allow the circulation of air and at the same time prevent draughts. The upper windows are also hinged at the bottom and turn in. You cannot reach these windows from the floor, so we move them by means of an appliance in use among us in hot houses. Cranks which can be operated from the floor move all the windows in the entire length of the building at one time. The mechanism is simple and not very costly, and appears to be durable and we find it very satisfactory. In a narrow building of this kind we get good ventilation. We have not adopted the Bidwell tie. It has perhaps many things to recommend it, but it is somewhat crude and rough as made by the owners, and it violates the essential principle which I kept in mind in building this stable. We have had a great deal of trouble with tuberculosis, and I determined, so far as possible, to make the whole interior plan of construction with just as few projecting beams, mangers, etc., as possible. The Bidwell stall has boxes, etc., and I do not like them. To give you an idea of the construction,—beginning with the outer wall there is a passage eight feet in width. The floor of this passage is of solid cement. The gutter pitches from the ends to the centre, where it is six inches deep. We do not mean ordinarly to have a surplus of urine to flow along this drain, generally using absorbents enough to take it up. I have provided an outlet from the lowest point of the gutter on either side with a cistern outside, and connecting with that is a water tight sewer pipe. Leaving the gutter, there is a flat form on which the cows stand, made in different widths for cows of different sizes, from five feet three inches down to about four feet six inches. Then there is the ramp and in front of it the trough for feed and water. It is shaped like an open V and is made of cement. The platform on which the cows stand is of plank.

A VOICE: What kind of wood?

Prof. BROOKS: We use yellow pine. It is quite durable.

A VOICE: Have you hemlock?

Prof. BROOKS: We would not like to use it. The yellow pine will not rot, and is not likely to splinter so much. Now, this V shaped trough is about eighteen inches in width. It runs the full length and is divided into sections and each section has a pitch towards the centre. At each end there is a tap—which we open when we want to water the animals—there being an outlet at the lower part of each trough. Besides watering the animals, this washes out the troughs and keeps them clean. We use the same trough for feed. We have, however, a moveable rack, which is turned up when the animals are out of the stalls and serves as a rail to prevent them from walking right out into the floor. They can come in and stand with perfect comfort when it is up, and if we are to water them we leave it up, but when we are to feed them we let it down and it divides the trough into individual mangers. This is planned in such a way as to be durable and simple in construction and not likely to get out of order. While some people might think this moveable arrangement objectionable, it allows the trough to be easily cleaned, and it is in the dust and saliva which accumulate in cracks and corners that germs find their congenial home. When this moveable rack is turned up we have a plain cement trough, and we save more time (as well as make a more thorough job of cleaning out the trough) than we lose by having to move the rack. There are two rows of cows. There is a floor twelve feet in width between them. There is at each end a big door, large enough for a load of hay to pass through. We have scales where we can weigh the feed. Ordinarily the hay and silage are brought in on trucks. In some parts of the States they have adopted a sort of trolley system overhead, similar to hay fork carriers, for that purpose. We are nearly all agreed that it is better to have the barn and stables by themselves, so that the cattle will have no feed above them and no manure below them. I do not know that you would altogether like our tie. It was an experiment—I am not altogether suited with it myself; but the cows are, I am sure, for it gives them the utmost liberty and comfort. It gives the cows so much liberty that it is rather more work to keep them clean than is desirable. The tie we are using is Waters' labor saving stable fastener. It is simple, not very expensive, very convenient in use and gives great freedom and comfort, and has this further to recommend it, that in case of fire all the animals can be liberated by one simple movement. We use this arrangement for turning the cattle out every day. In barns as long as ours—135 feet—we want passages between the ends, and the cows stand in sections of about twelve head, and we release all these in one section at once. The stables give a cubic air space of rather more than 1,200 feet each. You will learn the lesson by and bye that to make dairy products profitable the cows must be kept warm; and when you do that you will begin to get into trouble with your small, low stables.

Now, in another barn at Amherst we have adopted a different system which has much to recommend it. This barn is used for experimental work, mainly to test the questions whether it would pay better to use a little coal and keep the animals warm by artificial heat, or to shut them in a small, tight stable to breathe the same air over and over again. So I planned a stable with two small wings. Into one I introduced hot water pipes. In the basement is an inexpensive hot water heater. I endeavored to maintain a temperature of fifty to fifty-five degrees and let the temperature of the other stable vary from day to day with the weather. The temperature in the latter is very often below freezing, and once or twice has gone down to zero. We get more milk where the stable is warmed, but it is rather a singular circumstance that we get no more butter. However, I think this warming system will prove to be useful in another way. By having a little artificial heat we can get a greater circulation of air and manage with a smaller stable. We have at one end of this stable a box shaft with an opening close to the floor, and leading into the lower part of it we have a few hot air pipes. This causes the air in the lower part of the stable, where the carbonic acid gas is generally found, to flow up. This shaft runs through the roof where there is an Archimedian ventilator revolving constantly, which helps to promote the circulation of air.

I think when a stable is not very far from the house it would be possible to secure ventilation of the stable, at a very low expense, on this plan: I would set into the floor of the stable at occasional intervals a register, and leading from that register I would have a pipe made of sewer tile leading on a down grade to one of the chimneys of the house where there is a fire day and night. Then I would surround the chimney with brick or iron and let the lower end of the pipe communicate with the outer heat and I think the warmth of the chimney would create a draught and the foul air would be drawn down through this pipe from the stable and out through the roof of the house and you would never feel the expense. That is the true theory of ventilation.

CHEAPER PRODUCTION BY CO-OPERATIVE METHODS.

Mr. D. M. MACPHERSON, M.P.P., spoke on "cheaper production by co-operative methods." He said: In undertaking to give you a few characteristics of this important question I fully realize the great difficulty that is before me. When I reflect that in the past so much human effort and so much money have been used towards improvement, and when I see so little accomplished in that direction, then I realize how difficult it is to reduce the cost of producing any agricultural product in this country. The conditions are so difficult that any change will be slow.

Before I undertake to discuss this question it will be necessary to give some facts and figures as to the extent of the dairy industry and the amount of milk produced. The amount of milk produced in this Province for the manufacture of cheese is about 900,000,000 pounds. The amount of milk used for the manufacture of creamery butter is about 600,000,000 pounds, and of dairy butter it is claimed to be about 1,000,000,000 pounds, and for consumption in towns and cities about 400,000,000 pounds. This makes an aggregate of over 200,000,000 gallons as the entire milk production of the Province of Ontario. Estimating the milk as a fair average value for the past four or five years at about eighty cents per hundred pounds, we have $16,000,000 as the value of the entire milk product of the Province.

This being the value the next important question is, what is the cost?—and to find out the cost is very difficult. There are so many different conditions that we can only come to an approximate result. I have been figuring for the last ten or fifteen years. Taking the cost of milk production on my own farm and experience of other farmers in this and other sections of the Province, I find it very difficult indeed, to arrive at even an approximate idea of the cost; but so far as I have gone I find that the approximate cost of the milk, counting eighty cents a day for labor and wear and tear of machinery and interest on working capital at six per cent., makes the cost seventy cents per one hundred pounds, besides the soil fertility of ten cents worth in one hundred pounds. This brings us to the point that the cost of production is about eighty cents per one hundred pounds, and the value of the milk, taking this last year into consideration is not that amount. It is a serious fact for the consideration of every man who lives in this country, for if the products of a country cannot be produced for the value received for them what is there for the furture of that country? The cost of production must be reduced or disaster and ruin to all concerned are sure to follow if this state of things continues for time to come. More particularly is this the case when every indication points to still lower values in all farm products for the future.

Another important fact is that by making an estimate of the average cost of production fifteen years ago and at the present time, I find it costs more to-day to produce a pound of butter or cheese or milk than it did fifteen years ago. How is that result arrived at? I will try to tell you. I find that the cost of production is largely determined by the amount produced per acre or per farm. Now I find that land is less productive to-day on the whole than it was fifteen or twenty years ago. The average of hay then was one and

one-half tons per acre; to-day it is one and one quarter tons. The pasture crop now only gives 800 to 1,000 pounds of milk per acre; fifteen years ago it gave 1,000 to 1,200 pounds. Why such reduction? Just because there is less fertility in the soil, caused by the sale of farm produce from year to year. If the farms of Ontario lose annually in fertility two million dollars in dairy produce and one or two million in hay and grain, and one or two million in leakage and evaporation, this very large annnal drain and loss of fertility from causes mentioned is having its effect in declined amount of crops and increased cost of production, and the cost of production with declined market values leaves no profit on the average for the farmer, and when this is experienced it has serious influences. One is that the price of land declines, and debts and mortgages increase to an alarming extent, and also many farmers are forced eventually to leave their farms, and the active ambitious young men, experiencing a poor prospective future, are by force of circumstances driven away to other vocations in city life which offer better inducements to make a competency. In this matter the country is reduced in population and resource, for the best young men leave for reasons as already stated. In confirmation of these results we have it proven by the last census of the Dominion, that there are 37,000 less farms and farmers' sons in the Dominion than the previous ten years' census.

It is a most astonishing subject to reflect on that although the different governments have been endeavoring for the past hundred years to help through societies for the promotion of agriculture in this country to the extent of many millions of dollars, yet we find the profits of the farmer cut down till there is nothing for him. It is something which should cause us to reflect. It is so important that men should rise in their might and see if something cannot be done to stem this terrible tide of depression which is coming over the agricultural interests of the country. I believe, as stated, that the value of farm products is bound to come down. There seems to be an over production all over the world. There are every year so many new railways and steamships to carry produce to and from different countries that it seems to me in the future there shall be still a reduction of market values in mostly all productions of the farm. And if this prediction be correct, and the resultant conditions from practises now in vogue are that there is an increased cost of production, making the turning point of yearly profits into yearly losses, and at the same time forcing down land values, and driving the population out of the country, thereby reducing profitable trade in all directions, at this stage of such disastrous results as described, I ask this all important question: Can the cost of production in agricultural products be reduced to a point sufficiently low to make a good profit on the prospective declined market values, and at the same time reduce mortgages and debts, increase the value of land and increase the population of the country and convert an unprofitable trade of the whole country to one of profit and general prosperity? I emphatically answer this question by saying, yes, it can; and I hope to see the day that many products such as milk, beef and pork, will be produced for one half the market value at the present time. How is this to be attained?

There are three things necessary to put into practise to accomplish these desirable results. The highest skill, sufficient capital and industrious labor. One of these we have already, viz.; industrious labor. I believe to-day there is no class of men on the face of the globe who work harder than the Canadian farmers. Their hours are longer per day, and their days are more per year, than those of any other class. Hence we have one of the conditions necessary to success. Have we the other two? Show me to day a farm carried on in the Province with the maximum of skill and ample capital to carry out the requirements of success to the fullest extent. We have lots of farmers who use more than sufficient capital, but the point is, is that directed by the highest human intelligence, the same as the business intelligence exercised in other pursuits? I am sure not. On visiting the paper mill yesterday we wondered to see the skill of these men in taking the coarse wood from our bush and putting it through a process by which it comes out a beautiful glossy sheet of white paper. In that line I see the highest skill, sufficient capital and industrious labor combined. What doing? Producing a profitable business. But in agriculture we find that in no instance is the combination carried out to the fullest extent. Now I believe that these are facts and I give them to you just as I have

observed them in the open walks of life, and if the agricultural interest is so important that the prosperity of every kind of industry depends upon it in this country, then why should it not be so important that we should apply the best principles to it in order to make it a success and produce the best results—to get the maximum of production for the minimum of cost? I do not see why we should not apply to it the same principles as are applied to the manufacture of paper or any other industry. You will find that the manufacturer so handles his products that between the cost of production and the selling price he will have a profit for his work. So in commercial, manufacturing, railroading and every other kind of enterprise, you see the same effective combination of skill, capital and labor in promoting development. You often hear the question asked why a change has not been brought about in agriculture? My analysis of the situation is this: The farmer is a hard working man and he can never get his work done. The result is he is a good worker, but a poor business man. Another thing is with regard to the reason why the farmers have not capital. The conditions are unfavorable to them. You find the banking institutions are got up largely in the interest of the commercial requirements of our country. Take a farmer who has 1,000 bushels of grain in his granary and wants an advance. The banker will tell him, "We do not do business in that way." But the grain merchant can get an advance on that grain, perhaps even while it is in the same barn. The working capital of the country is largely controlled in the interest of commerce, and not in the interest of agriculture, and if there is any want more than another in this connection it is banking arrangements in favor of the agriculturists, so that they can obtain money and associate it with skill and diligent labor—and then, and not till then, will we be able to reduce the cost of production.

What is skill in agriculture? It is the executive power of an individual to direct capital and labor so as to produce the maximum of results at the minimum of cost. It is science in its true form; it is business calculation in its best form; and it is application in its practical form. Let me give you an illustration of what science, skill and practice are. I will try to illustrate it by giving you a few agricultural facts, and scientific facts, and business facts, and practical and unskilful facts, and then a skilful fact. The analysis of all products of the soil is the same, but in different amounts and in different combinations. The products of the soil are divided into three divisions,—plant food, such as stable manure of all kinds; animal food, such as hay, grain, etc.; human food, such as milk, meats of all kinds, fowl and fowl products, etc. These are the chief subdivisions of agricultural products, and yet it is a scientific fact that their composition is of the same elements, but in different combination, such as nitrates, phosphates, potash, lime and carbon. These elements have the same value per pound in whatever product they are found, but the market value of this product varies to a large extent, and, strange to say, the market values of all agricultural products are but very slightly affected by the value of the elements which are contained in them. For instance, the value of the elements contained in one thousand pounds of stable manure is about one dollar, and the market value of this is about fifty cents. The same value of constituent is contained in three hundred and fifty pounds of grain, such as oats or barley, and the market value of such constituent in such grain is about $3.50. Here we see that one dollar's worth of constituent has a market value of fifty cents in stable manure and has a market value of $3.50 in grain, or a gain of seven times. And, again, the same constituent value of one dollar's worth that is found in one thousand pounds of stable manure and three hundred and fifty pounds of grain is also found in a thousand pounds of milk, and the market value of this is usually about $8 to $10; or, the one dollar's worth is found in three hundred pounds of fat pork, and the market value of this is usually $12 to $14. These mentioned human foods are raised in market value over animal foods three times, and in plant food twenty times. The practical fact to now find out is the lowest possible cost of converting fifty cents' worth of stable manure (1,000 pounds) into milk, beef or pork so as to be worth the highest market value of $10 to $12. It is not a difficult matter to find the cost of the constituent value, nor the market value, of any given amount of plant, animal or human food. The constituent values are easily made up by referring to tables

of analysis as given by such men as Wolf, Johnson or Leibig. The market value of any article in the three subdivisions named may be easily computed by referring to market quotations in the commercial reports of the country. But to attempt to give the cost of producing any given article of animal foods, such as hay, grain, roots, etc., and also any given article of human foods, such as milk, beef, pork, mutton, etc., is a different matter altogether. The cost of transforming one thousand pounds of stable manure into one thousand pounds of milk, or three hundred pounds of fat pork (live weight) varies in proportion to the intelligence and skill of the operator, location, situation, season, soil, climate, cost of land, labor, machinery, taxation, interest, etc. It is a matter of fact that each person's efforts in this direction determine for himself the cost of production, and no set of values of cost can be determined in a general way, unless in each individual case a full and complete estimate is made; but there are three ways of determining the cost of production in any given locality or county, which are: maximum, minimum and average, and even this can at its best be only an approximation. Take, for example, the Province of Ontario. The average cost of producing milk is about seventy cents per hundred pounds, estimating and basing interest at six per cent. and a man's wages at eighty cents per day. The minimum cost is (*and can be made general*) thirty-five cents per hundred pounds and the maximum cost $1 per hundred pounds. It will no doubt be generally admitted that he who produces milk for thirty-five cents per hundred pounds is a skilful farmer, and he who cannot produce the same amount for less than seventy cents to $1 can be fairly termed an unskilful farmer. These are facts, strange and remarkable though they appear. The question naturally arises from them, What bearing have they on agriculture? or, What benefit is it to a farmer to know these scientific facts and business computations in guiding him in his every day's work on the farm? Much every way, as it means in the one case unprofitable farming, declined fertility, reduced value of land, disappointments, discouragements, discontent, unhappy homes, debts accumulating, mortgages increasing, and a general prospect of disaster to individual, family and country. In the other case, it means profitable farming and all the usual benefits arising therefrom to individual, family, city and state, such as increased fertility to land, increased value to all kinds of real estate, increased population to county, town and city, increased and more profitable import and export trade, increased wealth to all, increased happiness and contentment in homes, and the bright, active and ambitious youth remaining in the country to assist in building up an industrious, flourishing and progressive people, to make the country advanced in all that is good and elevating.

Referring to the two distinct conditions stated, which are profitable and unprofitable farming, these two are largely determined by the cost of production, and that farmer who produces the greatest amount of value of produce at the least cost is skilful, and that farmer who produces the least amount of value of produce at the greatest cost is unskilful, in the general acceptation and meaning of the term. And hence, to obtain the greatest profit from farm work requires the greatest modicum of skill, and he who wishes to have the greatest skill in farming must be the most scientific, must be the greatest business calculator, and have the greatest executive power at the same time, to put into effect these desirable requirements. This may be fairly considered the analysis of skill.

Yet there is another factor necessary in carrying this skilful knowledge into effect, which is capital. All political economists, as well as business men in all walks of life, recognize the important effective power of capital when well applied and utilized. As it is in the commercial world a necessary requirement to have and to use capital, so it is just as necessary in the work on the farm, if not more so. Ample capital, properly directed, is a necessity with all successful farmers.

There is one more requirement to make and to attain the maximum of profit in farming operations, and that is, "Industrious labor." All farmers should be industrious and attentive in their every-day work, and in this respect the Canadian farmer fulfils one of the three requisites to perfection. But when an estimate is made under present conditions as to what extent the Canadian farmer applies the highest skill and sufficient capital in his operations on the farm to make them most profitable, he is sadly deficient. Indeed, it can be safely and truly stated that not one farmer in the whole of Canada

directs his operations with the highest possible skill, and at the same time with sufficient capital for obtaining the maximum of results from the minimum of cost—in other words, for giving the greatest average profit per acre of his farm each year, and leaving the farm in the best condition from year to year to enable him to increase his profits progressively in the future.

I have stated that high skill in farming pursuits requires a full control and acquisition of all the science known in agriculture, along with a correct knowledge of business principles and calculations. I have also stated that ample capital is necessary in all cases along with industrious labor. This combination in effective degree determines the highest possible profit in any one or all productions of the farm.

I shall now proceed to give a few practical illustrations setting forth, by way of comparison, the difference as to results from a given amount of land, basing the cost of production in all cases, interest on working capital at 6 per cent. and wages at 80 cents per day, with usual wear and tear. I will first give illustrations of the average cost of production and value of product from one acre of land in grain and pasture for milk, and also on a hundred acre farm, which will be a fair average for the Province of Ontario, which will be designated as unskilful farming. One acre of land as usually sown with grain, such as oats, peas or barley, costs, to prepare the land, supply the seed, harvest, thresh and market, with a small allowance for wear and tear and interest on working capital, about $10, and this along with the fertility value in the crop makes about $5.00 more, or a total cost of $15.00. The average product of such grain in Ontario is about thirty-five bushels of oats and barley and twenty five of peas, or an average value of $10 to $12, making a loss of three to five dollars on the one acre of land. On a 100 acre farm in Ontario, where grain, hay and milk are sold, the prices obtained will be about one cent per pound for grain, and 70 cents per hundred for milk. The total average cash sales are about $500 at present market prices. The total cost of same for labor, wear and tear, interest on capital, etc., etc., is about $500, and in addition there is about $100 yearly sold off in the shape of soil fertility, which in the transaction leaves no profit for land possession, besides involving a loss of $100 of soil fertility, and a similar amount, if not more, of land value.

Take another acre of pasture skilfully handled, which produces 5,000 pounds of milk or 6,000 pounds of pork. This amount of milk per acre can be produced for $12, and the cost of fertility in its disposal is $4.00 more, making a total of $16. This milk can be fairly valued at seventy cents per 100 pounds, including the value of the residue of whey or skim milk, or in all $35, leaving a profit of $19 for the acre to credit or profit of land investment.

Take again 100 acres of land skilfully worked with regard to the rotation of crops, to the growth of the most profitable crops, to cost of labor, to wear and tear, etc., and made to produce the greatest profit and leave the land at the greatest value. This 100 acres will give a gross cash yearly sale of produce amounting to over $3,000. The total cost to produce this in labor, ware and tear, interest on working capital, etc., will be not over $2,000, and in addition, where there will be about $400 worth of fertility sold off the 100 acres yearly, there will be $1,000 worth of fertility put back to add value to the land, and there will be prospective increased profits in the future. Milk can be produced in summer by this skilful method for less than thirty cents per hundred, and in winter for seventy cents. Pork can be produced in summer for less than two cents per pound, and less than four cents per pound in winter, live weight. Beef can be produced for not less than five cents per pound in summer, and less than two and a-half cents per pound in winter. The surplus cash of $1,000 being the profit realized for land investment, and the yearly increase of five or six hundred dollars worth of fertility added to the land, is a yearly re-investment of the profits into the business, to create increased cash dividends in the future, and at the same time add value to the land. This application of commercial practices and correct principles to agriculture, transforms declining fertility and thereby declined cash dividends and declined value of land from year to year, to just the reverse condition, which would be greater fertility, greater cash dividends and greater value.

The question can now be fairly asked and answered satisfactorily in the affirmative: If such profitable and satisfactory results can be attained by the combination of skill, capital and labor on 100 acres of land, can these same or similar results be secured on other farms or most all farms of this Province of Ontario? I emphatically say, yes. The process must of necessity be slow and tedious, particularly at first, but, when the principles are properly understood and tested, then the general progress would be rapid and forced to the extreme limit. If such increased results were to become general, it is a natural question to ask, What effect would such a doubling of the production, quadrupling of the values and reducing of the cost have on town and city populations, of railroads, shipping, banking, manufactures, and all other industries of the country? To try to realize that and describe the benefits would be beyond our capabilities. If all farmers had good profits and sold double the amount of produce, they would employ double the hired laborers; the laborers would be well paid, and they, along with the farmers themselves, would buy more and pay cash for all purchases. This would at once set the wheels of profitable trade in motion. The export trade would at once be doubled, freights would decline, and profits of the public carriers would increase, because it is a law that full capacity in freighting can be done cheaper and more profitably to the carrier. The producer would have the full benefit of the decline in freight rates. At the same time, where a larger and more prosperous population was developed, their wants would be larger and more varied. Hence the imports would greatly increase, and this again would be in the interest of the public carriers. Having heavy and full loads of freight both in the shape of imports and exports would assist again the producer to get his freight carried cheaper—both as regards what he wanted to sell as well as what he wanted to purchase. When a much larger carrying trade both in and out is experienced, more men are required to handle such commodities. In connection with this there would be a large increase of population in town and city, all of whom would be well paid for their services. Then where there is a large increase of working population who receive good pay promptly in country, town and city, this double increase of population with cash in their pockets starts manufactures of all kinds to work to supply the natural demands. This increased manufactures demands more laborers, and they, too, are well and promptly paid for their services. In this, again, we have increased and prosperous population, in the advantages of which the towns and cities participate in to a large degree. Here we have again the merchants taxed to their fullest capacity, with increased hands and increased stock to sell, which adds another section to the circle to enlarge the whole. So could be mentioned other developments as to the trade and population of the country and city.

There is one other important factor which must not be lost sight of and that is values. When and where profits increase all values increase; when and where profits decrease all values decrease. Where profits and prosperous population increase, there is a corresponding increase of values of whatever produces such increase of profits, such as farm lands, city real estate and buildings, stocks, bonds, railroads and shipping, as well as forest and mineral products. If double the value of all such mentioned possessions is produced by increased profits then we can safely say that while this lasts double the wealth is attained in country and city.

In the Province of Ontario the value of farm land, stock and implements is about $900,000,000, and the value of real estate in villages, towns and cities is about $300,000,000, making a total value of $1,200,000,000. There are over 22,000,000 acres of farm land, and 12,000,000 under cultivation. The yearly average value of crops produced—hay, roots, grass and grain—is about $100,000,000. The proportion of this amount that is sold is about $50,000,000, and about $25,000,000 worth of what is sold is exported out of the Province. The value of farm land in 1880 was about $680,000,000, and in 1894 it was $580,000,000, or a decline in value in fourteen years of about $100,000,000. The total crop value in 1881 was $116,000,000, and in 1893, $101,000,000, or a gradual decline of crop values of $15,000,000 in fifteen years. These statistics, as taken from the Bureau of Industries for the Province of Ontario, clearly prove that declined profits arising from declined crop values causes nearly a corresponding amount of decline in

farm land values. The increase of mortgages and debts has arisen from nearly $100,000,000 in 1880, to $200,000,000 in 1895. This also shows the decline in farm values, and increase of debts are about equal to the decline of crop value, or, in other words, accounts for this serious state of things, as is well-known and felt by nearly all people of the country. And again, the decline of real estate values in towns and cities of the whole Province is generally allowed to be nearly ten per cent., and this percentage of declined values on $500,000,000 of city and town real estate shows a decline of about $50,000,000. This makes a total decline in value, in ten to fifteen years, of farm lands and town and city real estate of over $200,000,000, the cause being clearly traceable to the declined value of crops as received from the soil.

How to remedy this very serious financial state of the whole people of our country is easily prescribed, which is to create a condition that will produce greater crop values at proportionately reduced expense, leaving yearly a greater cash profit and at the same time leaving more fertility in the land to enable it each year to increase the crop values grown and thereby increase the cash profits from year to year and so on, making a progressive profit and progressive values in real estate everywhere. While it is easy to prescribe a remedy that may be correct in principle in order to produce the result aimed at, yet to acquire the necessary conditions is a much more difficult task. After careful and long application of study and experiment to acquire and understand these principles, I confidently believe that the discovery has been made, not only of what the principles are but how they can be put into general practice by many farmers of this Province, to a greater or lesser degree, according to the conditions and environments of each individual. The necessary conditions for acquiring profitable results are, as previously stated, a combination of high skill, ample capital and industrious labor, and as the average Ontario farmer is industrious he does not lack in this one part of the requirement; but he is almost entirely deficient of high skill and ample capital. How to provide skill and capital so as to be effective in the hands of the ordinary farmer to obtain profitable results, I hold is entirely a national work, to be developed by public object lessons in many parts of the Province. To fully establish these object lessons will altogether likely take five or ten years. The best way would be to take a stated section of the country, for instance one township, and then one county, and publically test what benefits could be derived from a proper combination of labor, skill and capital. Should this prove effective this same procedure could and would be rapidly extended to all parts of the Province without trouble. I have, during the past five years, in this way, in several instances transformed a poor farmer into a good, industrious farmer, and a poor unprofitable farm of low value into a profitable farm, doubled the value of the land and paid a handsome cash dividend besides, and this was accomplished only by combining skill, capital and labor. I have already offered to make a public test in the Provinces of Ontario and Quebec to prove what can be done, and am still willing to undertake, under ordinary favorable circumstances, to publicly demonstrate that twenty per cent. can be produced from the present value of a poor farm inside of from ten to twelve years, and from that profit pay off principal and interest on $30 per acre of loaned capital, which would represent the necessary capital required to produce such profitable results. The value of this land would at the same time be more than doubled, not counting the improvements made by the capital invested at the beginning. I would also employ double the labor on this farm and would produce four times the ordinary crop value, reduce the cost of production more than one-half and educate the owner so that he would be a skilful farmer and thereby be able to continue these results for time to come, so long as he continued to fulfil the three principles mentioned. In addition to the above results there would be $500 spent on five acres of public road, to also be an object lesson to show how the roads of the country could be built on the most permanent and lasting basis without any direct cost to individual or State. It will here be observed that there are about five acres of public road for every hundred acres of land, *i.e.*, three acres of front road and two acres of side road. Starting with an unprofitable, cheap farm, an unskilful farmer, small employment of labor and poor roads, and ending in ten years with a profitable farm of double value, employing double the amount of labor, quadrupling the crop value, building the proportion of public road that

this farm bore to the whole road at no expense to farmer or country, and at the same time making a skilful farmer, as well as producing all the resultant beneficial effects to trade and commerce, leaves nothing more to be accomplished. This public offer is still open, to be accepted at any time in the future, unless unforeseen conditions prevent its being carried out. I desire to here state that if such results can be obtained and made generally applicable, I see no reason why this question should not be of national importance and be taken up by the government of our country. If such can be accomplished, the sooner the better. Time is precious, as interest and principal on the many mortgages and debts of our country continue to roll up mountain high, and form a cumulative wave that, if not abated, sooner or later means disaster and bankruptcy to a great many living within the borders of our land. If millions of mortgages with interest can be paid off in each decade, and millions of value added to the real estate by adopting new methods and business principles without risk of loss of capital, prestige or credit, and millions of people added to the population, and the public roads built on a permanent basis, then it is high time for the authorities controlling the destiny of our country to stop spending millions on wrong principles and ineffective methods which never did and never will change our country's downward course. Would it not be sensible, businesslike, statesmanlike and humanelike to investigate and test better methods, and so attain the much desired results for the good of all our people and the world in general?

SECOND DAY—AFTERNOON SESSION.

The convention resumed at 2 o'clock.

BUTTER FOR THE BRITISH MARKET.

Prof. J. W. Robertson was the first speaker of the afternoon, his subject being as above. He said: I am to speak upon a subject which, while not very interesting in itself, is very intimately connected with the prosperity of the people of this part of Canada; and before I begin to speak on this theme, and while some of the audience are getting to their places, let me make one or two observations to you in Cornwall. On similar occasions in former years the farmers of the immediate vicinity where the conventions were held have turned out in large numbers to learn what might be learned about their own business and its management from those who have had opportunity for wider observation, and, in some cases, who have had longer experience than themselves. I do not wonder that many farmers have not availed themselves of the privileges of this convention, because farmers' institutes are now numerous and agricultural meetings of various kinds are frequent, at which the subjects dealt with by this Association and other practical details of farm work are discussed. At this convention, perhaps, the general policy of the Province in the matter of dairying may be said to be considered, and therefore the meetings, while not less important, may have less interest to the individual farmers than the discussions at farmers' institutes.

I am glad to welcome at this convention a distinguished American in the person of Prof. Brooks, whom you heard yesterday. About a year ago I had the privilege of going to the convention of the State Board of Agriculture of Massachusetts, where the people gave me a generous reception, not for my own sake so much as for that of those whom I represented.

Now, having taken as much time as I may in making these general observations, let me come down to my subject proper—"Butter for the British Market." The British people, as seen through their markets, are great eaters. That is their chief characteristic, and they talk about their food more than any people whom I have ever met. They do not confine all their talk to their food; still they talk a lot about what they eat. The British people have won for themselves a most distinguished place in civilization. In our little social circles we arrange those who sit at the table and those who wait on the table into two classes, and we think in our little way that those who sit at the table are a little better off than those who wait on the table. The producers of all civilized nations are to-day seeking the privilege of waiting on the tables of Great Britain. Do not you go about the country in Canada thinking we are a little folk who do not amount to much. The people of the United States, France, Germany, Austria, Italy, Spain, Denmark, and all the rest of them, are the waiters on the table of Great Britain and are seeking the favor of doing it. We are a part of that Empire on whose table the peoples of the earth are waiting. We ought to have a rather better show in our mother's house than other folks. We have not been having it in the past, and I hope that in the near future we will be able to let our mother know that it is wiser and safer and better to get pure butter from Canada than oleomargarine from Holland or any other place; that it is better policy to plan to get her fruit and flour and meat from within her own borders than to leave other nations in a position to say, "we can starve you out if we cannot frighten you out." Canadians should say to Great Britain, it will pay you to get butter for your market from Canada and cheese for your market from Canada; and now is our chance to show that we can supply these things in plenty and of excellent quality and capture this market. I say this because now is the most opportune time to get some advantage, if only a preference on the part of the consumers, for colonial rather than foreign products.

The imports of fine food products to Great Britain in 1894 are shown in the following table:

British Imports, 1894.

	Value.
Animals, living (for food)	$44,237,455
Dressed meats	110,594,951
Butter	65,489,268
Margarine	14,818,075
Cheese	26,644,708
Lard	13,424,292
Milk (condensed and preserved)	5,252,277
	$280,461,026

The consumption of meats in Great Britain is now about 125 lbs. per head of the population, and of that quantity 38 lbs. per head are imported. The consumption of butter is about 15 lbs. per head of the population, and of that about 9½ lbs. are imported. The consumption of cheese is about 13½ lbs. per head of the population, and of that 5½ lbs. are imported. The table does not comprise all they eat of these things; that comprises all they buy from outside countries of these things; and seeing they buy so much of these it well becomes us to see how much we can supply with profit to ourselves. We send a very large quantity of good cheese that is quite creditable to Canada, but cheese is one of the smaller items on England's bill. If we could capture a like share of the others, you see how much we might increase our revenue. We send England about one-half of the cheese which she buys, but less than two lbs. for every hundred pounds of all the butter she buys. An increase of our butter production means an increase of the production of dressed meats, because we will use the skimmed milk and butter-milk to raise calves and pigs.

Great Britain obtains her supplies of dairy products from the countries shown hereafter :

	Butter value.	Cheese value.
Total	$65,489,268	$26,644,708
	Quantity cwts.	Quantity cwts.
Total	2,327,474	2,266,145
From Canada	20,887	1,142,104
" United States	29,996	672,347
" Denmark	1,102,493	.....
" Australasia	292,097	54,375
" France	424,645	52,969
" Sweden	266,306	.....
" Holland	165,157	298,693
" Germany	137,755	.....
" Other countries	135,999	45,657

Canada is well in in supplying cheese to Great Britain. She now furnishes over 50 per cent. of the total quantity imported there. That has been brought about mainly by the excellent quality and by the means which have been taken to get Canadian cheese and its quality recognized under its own name all the way through to the consumers. The Canadian trade in butter is a growing one, and the shipments of fresh-made creamery butter in cold storage compartments during the current year have given it a better name than it had been able to attain hitherto. A very large trade in that product is coming in the near future.

The little country of Denmark, which is not nearly so large as Ontario, and which certainly has not so intelligent a population, sends nearly half the butter that Great Britain buys, and this is the outgrowth of not more than twenty years' effort on the part of the Danish people. Twenty-four years ago they were not "in it," but afterwards attention was directed that way, and now they have the magnificent revenue of over $30,000,000 a year for butter sent to England, and have increased the export of dressed meats tremendously. They are among the best off people of all the nations of Europe.

Then, Australasia has come into the markets and sends an appreciable quantity of butter to England. People say to us sometimes, "You are too far off." We are not half so far off as Australia, and Australian butter comes fresh flavored and sweet into the British market. Distance is not so difficult to overcome as it is said to be. France sends more than Australia ; Sweden sends some and Germany sends some.

Let me next mention what are the essential qualities in butter which people are willing to pay a high price for. It is not correct to say the value of butter depends on the quantity of fat it contains, because you can have butter which is not saleable for three cents. a pound and contains just as much fat as another butter which sells for twenty-three cents. a pound. It is that sort of thing we call flavor that fixes the value. It is not the nourishing properties ; it is the satisfying properties. So flavor is the most important quality of butter. The flavor of Canadian butter when fresh made is superior to the flavor of Danish butter when fresh made—not merely equal to it. We have been modest as a people, and have said nothing, while the Danes have been getting the English papers to write up their butter because it was fashionable to do so. We have suffered, also, because the flavor was not nearly so good in our butter when it reached the English market as it was when made. Danish butter gets to the British consumer without any deterioration, so that it is just as good when it arrives in England as it was in the Danish creamery. If we can do what they do—get the butter from the place it is made to the place it is eaten without spoiling in transit—we can out-do them in the price obtained.

I need not say anything of the body of Canadian butter. It stands first in solidity of all the butters that go to the British market. It is too yellow in color to suit the British consumers. They will pay more for a light colored butter. Let us, therefore, make it the least little shade away from being a lardy color.

Then Canadian producers have been putting too much salt in their butter for the people of England, who like a comparatively mild and fresh, that is not salt, butter. Half an ounce of salt to a pound of butter is enough in most cases; and the salt should be of fine grain and pure quality.

Two things are objectionable in dairy salt, one is a coarse insoluble grain, and the other is a limy substance which has the effect of giving the butter a limy flavor.

I would use the finest Canadian salt. It is quite as good as the best I have seen anywhere, and better than I have seen in most parts of the Empire.

In some other respects our butter needs improvement. Butter does not taste any nicer for being in a nice package, but the Englishman thinks it will, and he pays for what he thinks, and not for what you or I think. I know a nice school girl about ten years of age, I suppose if she had a tawdry looking dress on, with her face unwashed and her hair all unkempt, she would be just as good a girl as when she steps to my side neatly dressed, with tidy hair and her face aglow with the bloom of restful cleanliness. Still I would not like to have her by me so well in one case as in the other. So the English shop-keeper, who does not care to have his shop tawdry, and is looking for a high class of butter, does not like to have his customers see a cheap looking lot of butter about his place. He says, "Oh, that butter in unsightly packages belongs to the low grade shops," and it has to go for a low grade price. Let us have clean packages, that look nice. Let us have a package, too, capable of keeping the butter without injury to the quality. The square packages, which hold fifty-six pounds, can be bought for sixteen cents. and lined with paper for not more than one and a half cents. a box. The butter in such packages can be packed closely in the refrigerator compartments on the steamships and no space is lost. That you may follow my argument and see the proof of it as clearly as I am able to put it to you, let me go back for a moment to the process of making the butter. When a buttermaker begins the manufacture of milk into butter he either puts in what he calls a fermentation starter or exposes the milk or cream to the air and lets things fall into it which start fermentation. The atmosphere is filled with all sorts of things that cause fermentation. That is a fermentation starter which changes sweet into sour cream, and by and bye, if left long enough, into decayed cream. Now, when the cream is churned and the butter is taken out of the churn, a small quantity of these minute forms of life are retained in it, and they go on working a change and spoiling the butter. So you have to deal with this fermentation starter. Now, if you have a fermentation stopper, you can hold the butter quite unchanged. Fermentation makes no progress at the freezing point of water, so if you keep the temperature down to 32° you have a fermentation stopper, and the fermentation starter will do no harm. If a pound of nice butter is made in the best way, and kept till it is two days old, allowing the fermentation to go on slowly to ripen the flavor, and it is then put down to a temperature of 32° and kept in a closely sealed package in a dark place, you can keep it for three or six months, and it will not have changed as much in that time as it would in three hours at a temperature of 75° in your pantry. So the difficulty of safe transportation is not great if you stop fermentation. If butter is made in June and kept at 32° in a dark place in a fairly close package, no man can tell in January whether it is three days or six months old by any difference in the flavor. That is what the Australians have been doing, shipping their butter 9,000 miles and getting it fresher to the consumer than butter sent thirty miles in a warm car in England.

Now, I come to this as being a thing we ought to do. We ought to make some provision for getting our butter to the English consumer in its best condition. That is the essence of the whole question. If you can do it you can capture his preference and his price. One thing more we want to do—we must get it there in our own name, so that people will know where it comes from and ask for it again—so we will work up a permanent trading connection with them.

That brings me to discuss the next part of my subject. If it be important to get the butter there in the best condition, then provision must be made for preserving it in that condition before as well as during shipment. What provision exists at most creameries? Well, they have a so-called cold storage room in the creamery. I have never been anywhere in a creamery where the temperature would stand at an average lower than forty degrees, with the single exception of the Renfrew creamery. What happens? The butter is put into the store-room or cellars at forty-five degrees, and the creamery man says: "I don't care to sell," and goes on making butter. "I will hold till the whole month's make is ready to sell," and the price is going up and the flavor is also going up (laughter). Being Scotch, the creed of my marketing efforts is to get the most money I can for what I have to sell. That is a different thing from selling every week, or not selling every week and putting the butter where it will spoil in the meantime. I have not said "Sell every week," but "sell when you like, and in the meantime keep the butter where it will not spoil." If a creamery cannot afford to have a cold storage room where the butter can be kept at a temperature of thirty-two degrees, let it be shipped every week to some place where it can be properly kept, and if it is to be held for an expected better market or for any other reason, let it be held there without deterioration. I do not think it pays a creamery now to have a large building for that purpose because the proper storage accomodation costs a good deal, and where the creameries cannot chill it themselves and keep it cold it will pay to ship to some place for that purpose. That requires, as a next step, accomodation on the railways by which the butter can be taken to these central or safe cold storage places every week. Now, last year, in connection with the cold storage system, we arranged for a service on the railways whereby a refrigerator car was run once a week for the carriage of butter. The creameries of Quebec used these cars quite largely, so that the Government guarantee on some of the routes was not called for there at all. But over the Province of Ontario the cars were used very, very little, indeed, and butter was held until the flavor was partly spoiled, while these cars were running empty most of the time. We gave the same chance last year for shipping dairy butter as for creamery butter in this way, and dairy butter did better too where shipments were made up promptly. Let us get this into our heads, that butter begins to change in condition after three days if kept above thirty-two degrees, but if you keep it at that temperature then you can hold it any reasonable length of time. We propose to continue the cold storage service this year, and I hope the creamery men and merchants over Canada will see that their butter is put in a safe place before it begins to spoil, and it will get us a good name instead of a bad one, and we will find our entrance to the British market easier and more profitable to ourselves.

That brings me to one of the last parts of my subject. I want to try to make clear what a market means to the man who has butter to sell. What is a market? It is a place to exchange in. It used to be that a man would exchange furs for blankets and bacon, etc. Nowadays by the medium of that which we call money we do not make the exchange of furs for blankets and bacon. The process is different but the end is just the same as before, and so when a man has a tub of butter to exchange for something else, he has to recognize two things: First, that the butter has an intrinsic value as food that does not change much. A tub of butter in June has the same intrinsic value as a tub made in July if it is made well. If it is not it does not gain in value although it "goes on from strength to strength continually." Now, while the intrinsic value of the butter, if preserved, remains the same, the exchange value fluctuates all the time. I may get $10 for a tub to-day for which I might get $8 or $12 two months hence, and that is where skilful commercial "gumption" comes in, which we have not got any too much of just yet in this country. I am not taking the record of one year only to support a theory, because the fluctuations last year were almost the same as for the last ten years. I am taking the best butter first. The Normandy butter from France stands away above the Danish butter. We have in Canada the conditions for making butter just like the French butter. Our flavor and body are more like theirs than any I have seen. These are the prices in 1894: In July the price was 115 shillings for 112 lbs. It went up in January to 145 shillings. Take the price of nine or ten years, and from November to March it is

about six cents a pound above the price of the rest of the year. Does that not mean that we ought to try to exchange our butter at a time when it has a high exchange value, or in other words, when it sells at a high price per pound. It is as clear to me as noonday. Why should I exchange something which I have when its value is lowest? Of course I do not want to, and will not when I can help myself. Then, take the Danish butter. There seems to be a uniform fluctuation upwards to October sustained to March, and then the price goes low again. That means we should have our summer butter made in June, July, August and September, kept in safe, cold places, and sent to Britain in October, when the demand is best and the price is comparatively high for that class of butter.

To do that we need cold storage somewhere accessible to the creameries. There are now three large buildings in Montreal—or will be next summer—where cold storage can be had at any temperature, from twelve degrees upwards, for very reasonable rates. Last year, to encourage the creamery men to store their butter which was to be held, the Government agreed to pay half the charges. That may be continued this year. Then there have been cold storage services on the railways and steamships, which will be very much improved. Last year we had cold storage on the steamships which kept the butter after it was taken on board. We used insulated compartments, and they did very well. It was like a log-house in the woods, which served the purpose first-rate until the people were ready for something bigger and better; and if a settler had built a mansion in the woods in the first place he would not have stayed long in it. So we began in a simple, inexpensive way, and there was no failure. But now the time has come when we should put refrigerating compartments on the steamers. On one line of steamships at least it is expected there will be cold storage accommodation for the carrying of dressed meats, cheese and fruits at suitable temperatures, so that they may be landed in the English markets without any injury.

One thing more needs to be considered. If gotten to the other side in first-class condition our butter needs to be made known in its new condition under its own name. Somehow Canadian butter has received a bad name, and it is not easy to recover from the incubus of that. It is needed to call the attention of the British people next summer to the fact that we are giving them butter of a different character from what went from Canada in the past.

A little talk is sometimes indulged in by those who perhaps do not follow the bearings of this question in its entirety, to the effect that if any man holds butter which he has bought from June till October, he thereby becomes a "speculator," and by throwing that epithet at him they suppose they have altogether discomfited him. I am not an apologist for speculators, but a man who buys on speculation merely proves his faith in the future of the market for his purchase. So if a man buys butter for his own good money in June and holds it till October he has faith in the market, and is a good factor and not a bad factor in the market. Take our cheese trade; the factories are only making on the average five and a half months in the year, and the consumers eat cheese in England twelve months in the year. If the Canadian buyers sent it all over in five and a half months it would be cheaper there; in fact, might be unsaleable. Legitimate and *bona fide* speculation is a good factor in commercial life, and when I meet a farmer who has the notion that a speculator has always an injurious influence on his business I differ from him. I favor new methods of trying to help the farmers to get our products to the market in the best way, and I would brush aside every middleman who stood between to hinder the producer from getting his rightful share of what the consumer paid. (Applause.) But if you have no middleman between you cannot get the other two together. The buyer who helps in the transaction is entitled to get his share. In that sense let us get our butter to the British market through the regular commercial agencies, trying to get it over in a safe, unspoiled condition, giving an equal chance to the merchants who use their courage, skill and capital, and to the manufacturers to increase their profits. (Applause.)

Mr. GRAHAM: Will not this butter which you keep at thirty-two degrees depreciate very much in flavor once you get it into the retailers' hands?

Prof. ROBERTSON: No. Let me show you how that is. Everybody says if you freeze beef, so soon as it thaws it spoils. When you freeze beef, the cells, which contain protoplasm, are burst, and when it is thawed the juice runs out and it spoils. If butter be kept so cold that the brine in it becomes frozen the butter will be opened by the expansion of the brine, and thus the air will be admitted; but in order to bring that about the brine must be frozen. Unless the brine is frozen the butter is chilled only and not frozen. The chilling does not open up the grain to let the air in, and consequently it is no more liable to spoil afterwards than if it had not been chilled.

Mr. MACPHERSON: What temperature will the brine freeze at?

Prof. ROBERTSON: The strongest will freeze at zero (Fahrenheit), and the weaker brine at perhaps fifteen degrees below the freezing point of water.

Mr. MACPHERSON: You would not have it below fifteen degrees?

Prof. ROBERTSON: I would not bring butter below thirty-two degrees only for a short time, when it may be brought down to twenty-two degrees, in order that the inside of the package may get cold quickly.

A VOICE: Do these packages hold brine?

Prof. ROBERTSON: When well lined with two thicknesses of parchment paper.

Mr. MACPHERSON: Is it necessary for these boxes to hold brine?

Prof. ROBERTSON: I do not think it is really necessary, because if there is paper covering the butter there is practically no evaporation at thirty-two degrees. It does not pay to buy thin, cheap paper which sticks to the butter. It pays to buy thick, strong paper. The Australians are wise in this, that when the paper is taken off the butter has all the sparkle that it had when just two days old. The paper keeps the moisture in.

In answer to a question by Mr. ALEXANDER, of Montreal, Prof. ROBERTSON said: The inspectors of food in Great Britain are very diligent, and when butter is found there that contains anything over eighteen per cent. of water the grocer caught selling it can be taken up and fined for adulteration. I have never known of butter being sent from Canada that contained so much water as that, but I have heard of some that came dangerously near it. The butter should be worked twice. It would be a most injurious thing if even one tub of Canadian butter should be found which would give rise to an action in England, because our competitors would have the fact published everywhere. If worked twice at fifty degrees there is no danger of that.

Mr. PEARCE: What about butter driers?

Prof. ROBERTSON: I have never seen them in use. If the ordinary butter-workers are used twice there is not the least risk of leaving too much water in the butter.

Mr. ALEXANDER: Is there not a danger of leaving it too greasy?

Prof. ROBERTSON: The butter-maker can tell when he folds the butter on his butter-worker when it is worked sufficiently. If it will fold over about half before it breaks it is in the best condition.

Mr. MACPHERSON: Perhaps you have a preference for butter-workers.

Prof. ROBERTSON: I have not. It may be a prejudice, but I like to have a butter-worker by which a butter-maker feels the grain of the butter through the way it bends or yields to the butter spades in his hands. He gets more information through his muscles than through his eyes.

PRESENTATION TO MR. MARK SPRAGUE.

At this stage of the proceedings a pleasing incident occurred which was not down on the programme. It was the presentation of a handsome gold stop-watch by the Association to their efficient instructor, Mr. Mark Sprague. Mr. Sprague having been invited to the platform, the presentation was made by Prof Robertson on behalf of the

Association. In doing this Prof. Robertson said: I have been asked to make a few remarks for Mr. Sprague's especial benefit—not of a scolding kind—but on behalf of the Association, in offering to him a tangible token of their high appreciation of himself and of the labor he has performed so faithfully for the creameries of the Province of Ontario. This Association, unlike many other corporate bodies, has a soul (laughter and applause), and when a man serves a corporation whose directors have large souls, great hearts and broad minds, he is inspired and impelled to good service. In this respect a servant usually reflects the spirit of his master. So, on behalf of the Ontario Creameries Association, I have pleasure in presenting you with this beautiful gold stop-watch, which will enable you to time the speed of separators, and otherwise aid you in your work while you watch over the interests committed to your care. While valuable in itself, I think it will be still more precious to you as the vehicle which bring to you the respect and good will of the members of this Association, which is doing so much for the country. I know, as the chief officer of the dairying service of the Dominion of Canada, that I am only giving voice to the opinion of this Association when I say that Ontario owes you a debt of gratitude for faithful, unselfish service; and let me express the hope that through your example many of Ontario's sons may be awakened to give her their best service in the fields of dairying and agriculture. (Applause).

Mr. SPRAGUE was deeply touched, and replied very briefly as follows: This presentation is very unexpected by me, I assure you. I have labored to the best of my ability for a number of years, and a token of this kind is very much appreciated by me. I thank the President and Directors of the Ontario Creameries' Association, and one and all of you, for this very valuable present. (Applause).

INJURIOUS INSECTS.

Mr. JAMES FLETCHER, Dominion Entomologist, Ottawa, was next introduced, and said: The subject I am going to speak about to-day is "Injurious Insects." These creatures from year to year reduce your incomes, sometimes without your knowledge, to a large extent. I will speak on this subject for about twenty minutes of the half hour at my disposal, and then will leave ten minutes for anyone who wishes to do so to ask questions. I think in this way that any information I can give will be more definitely directed to those kinds of injurious insects which are immediately of interest to those present. I might speak of many insects which were of general interest, but which were not troublesome to you, but if I confine my remarks to general principles I can speak of the various kinds of injuries committed by insects and the best remedies for the different classes; then if when I am finished you will ask questions about those which have occurred in this district I can answer better with regard to each one's requirements. There is no doubt that a very large percentage of all farm crops is destroyed each year by injurious insects. From the best information available this loss must be put at no less than ten per cent. of all crops grown, and this amount is actually less than it really is in many years. The plain English of this is, that if you grow a crop worth $1,000 you lose every year $100 of that amount. This, too, is a direct tax which is frequently paid without a complaint by the farmer because he thinks he cannot help himself, which, however, is not the case, for with a small amount of knowledge a very large proportion of this loss can be prevented, and if I impress nothing else on you to-day beyond the fact that you have in me a servant who is being paid to study injurious insects for you and find out the best remedies to prevent their attacks, I shall consider my time has been well occupied.

There are perhaps about one hundred different kinds of injurious insects which every year cause serious injury to crops in some part of Canada. These, of course, do not occur in the same locality, but complaints are received concerning them from some part of Canada

every year. It is encouraging to know that of this number of what we may call first-class pests by far the larger portion have been sufficiently studied for the recommendation of practical remedies immediately upon the attack being made known. The secret by which remedies can be discovered is to know the life history of the insects which cause the injury, so that we may be able to attack them at that stage of their life when they are most susceptible of injury. The life history furnishes us with the knowledge of how they pass their lives and at what times of the year they are passing through their different stages of development. Perhaps it is hardly necessary to state here that all insects pass through four stages of development; first, there is the egg, which is laid by a female insect. From this egg hatches the second stage or larva, which, in most insects is the stage in which the greatest amount of injury is done. In the different orders of insects we find various popular names for this stage. The larva of a fly is called a maggot; of a beetle or a wasp, a grub; of a butterfly or moth, a catterpillar, and so on. It is sometimes rather important to prevent mistakes that an insect should be called by its accurate name when speaking of it, but if specimens of all insects concerning which enquiry is made are sent forward with the letter there is little chance of error. In this country nearly every small member of the animal kingdom of which the name is unknown is called "a bug," whereas as a matter of fast this name properly belongs to a very small order of insects, which are for the most part characterized by a very nasty smell, but particular by having the mouth parts in the form of a slender, hollow tube.

An important point about the structure of insects which it would be well if every farmer in the country understood, is that the mouth parts of all insects are formed upon one or other of two plans. If a large number of insects, no matter how many, were examined, they could all be divided under two heads. First, those which have jaws with which they bite the substance of their food, such as the Colorado Potato Beetle, all kinds of caterpillars, currant and cabbage worms. In the case of all these, it is quite apparent by the riddled leaves that much of the substance of the plants attacked has been eaten away. The other class has the mouth parts in the shape of a slender, hollow tube, such as we find in the mosquito and all the true bugs, many of which attack plants. These all live on the liquid juices of animals or plants, which they suck up through a hollow tube. The importance of this much knowledge to farmers is due to the fact that all remedies for injurious insects must be devised in accordance with the nature of the form of the mouth parts of the insects which are attacking his crop. For those insects which eat the substance of plants, it is plain that if some poisonous material is placed on the food plant, it will be eaten by the insects at the same time as the leaves, and the insect will be poisoned. On the other hand, however, for those kinds which simply live on the juices of the plant, this remedy would be useless, for the attacking insect would push its slender beak in between the particles of poison, puncture the plant, and suck out its juices from beneath the skin. Too much importance cannot be laid upon the value of this knowledge, and the first thing to look for when you notice that a crop is being injured by insects, is to observe how the injury is being done. From the great utility of Paris green as a remedy for all insects which bite their food, a general idea seems to have sprung up that Paris green is a remedy which can be used for every kind of insect. This, however, is far from being the case, and it is important that the fact should be known, for very frequently when farmers take the doctoring of their injured or diseased crops into their own hands, they use the wrong remedy, and then get discouraged and adopt the false notion that very little can be done to prevent the attacks of insect pests. There are, as I have said, two classes of injurious insects—*Biting insects* and *Sucking insects*. For the first class, Paris green is the most generally useful material, but for the second class we require a different kind of remedy altogether, viz., some substance which will destroy the insect by merely coming into contact with their bodies, and which does not require to be eaten at all. There are several materials which answer this requirement. I have stated that the number of first class pests which occur every year is only about one hundred, and of these a large proportion, perhaps ninety-five per cent., have already had practical remedies

discovered for them. We may ask, what is a practical remedy? A practical remedy is one that is, first of all, effective, so as to do the work we use it for; then it must be cheap, so as not to cost more than the crop is worth, and lastly, it must be simple, so as to minimize any chance of error in its composition or application. Remedies are either preventive or active, and the first of these can again be divided up into agricultural and deterrent. Agricultural preventive remedies consist of such methods as high culture, by which a vigorous and healthy growth is encouraged, and the crop is pushed on to maturity as soon as possible. Clean farming, by which all weeds are kept down and no rubbish is left about to act as winter shelters for insects; early or late seeding, so that a crop liable to attack is presented to its enemies at the time they usually appear in such a condition that they cannot injure it. Rotation of crops is also of great value as a means of keeping down the numbers of injurious insects. Every crop has its own special insect enemies, and if large areas are put in under one crop, or if the same crop is grown in the same place for several years running, these special enemies will increase year by year. By proper rotation of crops, insects feeding on one class of plants do not find the same food plant in the same place the following year. Deterrent remedies include all such operations as the painting of the trunks of fruit trees with poisonous alkaline or other obnoxious washes. A widely adopted remedy of this nature is the regular painting every year of the trunks of apple trees with an alkaline wash made of soft soap reduced to the consistency of thick paint by the addition of a strong solution of washing soda in water. This is put on apple trees at the end of May and in the middle of June, and forms a thick coating not easily washed off with rain. Other deterrent remedies are the many kinds of mechanical contrivances put round the trunks of trees to prevent insects from crawling up them. This remedy is used to prevent the wingless female moths of the canker worm from climbing up apple trees to lay their eggs. Another method of keeping insects away from vegetables or animals is to destroy or mask the natural odors of the plants with some other substance which has a strong or disagreeable odor, such as gas lime, coal oil or carbolic acid. The remedies most usually recommended are active remedies, and include not only such operations as may be spoken of under the head of hand-picking, when the individual insects are sought out and destroyed, but also the application of the various kinds of insecticides or other poisonous substances which, during the last few years, have come into use so widely. Nearly all the insecticides may be used either as dry powders or as wet mixtures. In the case of Paris green and other arsenical poisons of a caustic nature, it is necessary to mix them with some diluent before they are applied to tender vegetation. For dry applications, almost any dry, fine powder is suitable—flour, land-plaster, air-slaked lime, finely sifted wood ashes, or even road dust. The only important thing is that they should be perfectly dry and in a fine state of division, so that they may be evenly distributed over the plants as a very fine powder. The proper quantity of the different diluents to be used with the insecticide will vary with the insects to be treated, and the plants to which they are applied, but in most cases, if Paris green be used, it may be mixed with fifty times its measure of the diluent. There are a great many different kinds of instruments for distributing dry poisons, but perhaps the most convenient thing is a small bag of muslin or cheese cloth, from which the poison can be conveniently shaken by tapping it with a slender rod. Undoubtedly the most convenient way of of distributing poisons is in water, by means of a spraying pump provided with a good spraying nozzle, and this latter, it must be remembered, is quite of equal importance with a good spraying pump. During the past two or three years the value of spraying nearly all crops for their protection from their insect enemies has been widely recognized, and to-day the progressive fruit grower, gardener or farmer who does not spray his crops is certainly neglecting one of the most useful aids to successful competition with his neighbors. I have mentioned Paris green, and this I believe to be the most useful of all the arsenical poisons. It is always obtainable, and its nature is now pretty generally understood, so that there is little chance of mistake in applying it. In fact, I consider Paris green almost an ideal material for the purposes for which it is recommended, for poisoning biting insects. Its intense green color advertises its poisonous nature. Although so poisonous, it is quite insoluble in water; that is, it will not

dissolve in water, and it is only when acted upon by the gastric juices in the stomachs of insects which eat it that its poisonous qualities are released. This takes some time, and it is well to mention that Paris green is a slow acting poison, and if results are not seen very quickly after its application, farmers must not be impatient, but wait a little. I have frequently seen it applied to potatoes for the potato beetle, and because the beetles were active the next day, I have been told that Paris green was no good. I have always said, "Wait till to-morrow," and in all instances the result has been satisfactory. Paris green does not dissolve in water, and when we use it in water it is merely a mixture, the poison being contained in the water simply in suspension. This must be remembered, and I mention it here because my attention has been drawn to the fact here to-day that some farmers are in the habit of mixing Paris green in a pail of water when they go home to dinner, and then leaving it to stand until afterwards to be used in the afternoon, thinking that more strength will be taken out of the poison, and upon enquiry I find that they have not recognized the necessity of keeping the mixture stirred up all the time. In anticipation of the many qusstions which are sure to be asked at this meeting in the same way that they are in every other meeting that I attend, as to "What is the best remedy for the potato bug?" and "Haven't you got anything yet that will keep down the potato bug for us?" I say, "Yes; Paris green." This is the only practical remedy, and is so effective and cheap that no one need ask for a better until the millenium comes, when, perhaps, we may not have to work hard to get satisfactory results.

For sucking insects, such as plant lice, scale insects and true bugs a most valuable remedy is a mixture of coal oil and soap suds now widely known under the name of kerosene emulsion. The best formula is coal oil, two gallons; rain water, one gallon, and any kind of soap half a pound. Boil the soap in the water until all is dissolved, then while boiling hot turn it into a large vessel holding two gallons of coal oil, churn it vigorously for five minutes, when it will be of a smooth, creamy nature. If the emulsion is perfect, it will adhere to the surface of a piece of glass dipped into it. If not sufficiently churned it will run off as though on an oily surface. This is the stock emulsion, and before using it on vegetation it must be diluted with nine times its quantity of water. It may be sprayed upon all kinds of vegetation in this strength and will do no harm, but will destroy all kinds of insects upon which it is sprayed. This mixture was used very satisfactorily against the Horn Fly, which was so troublesome in many parts of Canada up to last year, but which, from what I have been able to learn of its habits, will certainly decrease in numbers and the virulence of its attack from this time forward in Canada. There are many kinds of insects which I might speak of, such as the apple tree borers, Codling moth, plum Curculio and turnip flea, but it will perhaps be better to carry out the plan I suggested and answer such questions as may be asked with regard to the different kinds of crop pests. In addition to the injuries committed every year by injurious insects, farmers suffer an equal amount of loss annually from the attacks of many kinds of parasitic fungi, such as potato rot, rusts, smuts and mildews and particularly the black spot of the apple and the mildew of grapes. Bulletines and reports have been published upon all of these subjects by the Experimental Farm at Ottawa, and also by the Department of Agriculture in Toronto. Before sitting down I would remind you all that any information concerning your farming operations can be obtained from the Experimental Farm at Ottawa by writing for it. Special arrangements have been made by which letters and all parcels of specimens for examinations can be sent free of postage, and I can assure you that all the officers at Ottawa in charge of the various department will do their utmost to assist you with any information at their disposal.

The PRESIDENT: What is the cause of scab on apple?

Mr. FLETCHER: Scab or black spot of the apple is due to the attack of a parasitic fungus. This has been treated of at some length in Bulletin No. 23, of the Experimental Farm series, where it will be found that a satisfactory remedy has been discovered in the Bordeaux mixture, which for the apple is recommended to be made with four pounds

of copper sulphate, four pounds of lime and forty gallons of water, but which when sprayed upon the potato vines for the rot has given rather better results with six pounds of copper sulphate, instead of four.

A VOICE: What causes it? Does planting the trees too closely?

Mr. FLETCHER: Certainly that would be the cause of a lack of vigor and health in the trees and might aggravate it. The cause is just as certainty a distinct organism which is propogated by spores and carried by the wind from tree to tree.

Mr. W. H. BYER: How can blackbirds be prevented from attacking the corn in the spring of the year?

Mr. FLETCHER: A great many adopt the plan of rolling the seeds in tar before sowing, others think this is of no use. Our foreman has a method by which he claims he can keep crows away. He poisons a few eggs with strychine and leaves them in the fields and when one crow has eaten any of this poison and dies he leaves it in the field and no other crows will come, so he says.

The PRESIDENT: The way my father told me was to get up early in the morning and keep stirring the dirt right around the hills of corn. (Laughter.)

Prof. BROOKS: I think, perhaps, I can help a little on the point with reference to applying Paris green. There is a little implement known as Leggett's paris green sprinkler, which you fasten by a strap over the shoulder and by turning a crank you can apply the Paris green as fast as you can walk. We use the machine with great satisfaction, putting on the Paris green to one row at a time, and, with the minimum of exercise, a man can do about six to eight acres in a day. It reduces the Paris green to a sort of mist which does not burn the leaf, and we have found it the most satisfactory way. If you add flour there is so much more body to deal with, and whether you use plaster or water the same is true.

A VOICE: Can you give some remedy for smut in wheat, corn and oats?

Mr. FLETCHER: The smuts in wheat and oats are very similar and can be prevented by an application of one pound of bluestone to two and one-half or three gallons of water. This is explained in the Experimental Farm reports and bulletins. Smuts in corn is a different disease, and very much harder to treat. There is no remedy which has been invented.

THE ORIGINAL FORMS OF DAIRY PRODUCE.

MR. FRANK T. SHUTT, M.A., Chief Chemist, Dominion Experimental Farms, Ottawa, was again introduced, and on coming forward said: No apology, I feel sure, is necessary in these later days, and especially in speaking to an audience composed of the members of the Creameries' Association, in presenting to you this afternoon a few thoughts upon the fundamentals of agriculture from a scientific, and more particularly from a chemical, aspect or standpoint. I fancy that now-a-days all our progressive farmers have realized that a complete study of their work is necessary and essential to profitable farming. It is so in every other business and profession, and we in agriculture have lately come to see that such is essential to our work.

I am to speak somewhat in technicalities, but I shall endeavor to make myself plain and easily understood. If mottoes are not copyrighted I should like to give you one, "Science with Practice." Such a motto indicates the lines upon which we as individuals and as an Association must work in the future. The science of agriculture tells us of the why and wherefore of our farming operations, and of the fundamental principles which underlie them, a knowledge of which is necessary for the intelligent conducting of our farm work.

I shall treat my subject under three heads. Regarding the original forms of dairying products we may ask: What are they? then, Where are they? and then, Why should we endeavor to learn about them? But it may not be amiss if we first reflect upon the relation of the farmer to his products, if we consider that it is the farmer who, by his skill and intelligence, directs the conversion of crude materials of plants and animals into finished products. He uses the agencies which nature has provided—plants and animals—and just in so far as he understands the requirements of plants and animals just so far will he be able to economically, intelligently and profitably conduct his work. Both in the production and selling of our goods we have to compete with men who are keen, and whose knowledge and means of transit of goods are often better than our own. To meet them here or elsewhere it is necessary to be alive to all methods of progressive farming, and further, to remember that progress and development in agriculture have been made through the exact knowledge afforded by the sciences. Chemistry has given us the Babcock test, which revolutionized our old method of testing milk, and put the sale of milk on an equitable basis. The science of mechanics has given us the separator, which enables one to skim milk more closely than by any method of deep or shallow setting. The science of bacteriology has given us the knowledge of the presence of bacteria or microscopic plants which lead to the development of the right or wrong flavor in butter and cheese, for we know that it is the presence of certain bacteria which by their development produce in butter and cheese a condition which we might call "off flavor."

I think it is remarkable when we compare the condition of agriculture of a few years ago with that of to-day, and reflect upon the little knowledge that was then prevalent with regard to these matters, and recognize the immense strides that have been made during the last decade. I think there is cause for congratulation and very much satisfaction, and I feel sure from what we can see to-day that as Canadian agriculturists we are not, and have not been, slow to avail ourselves of the discoveries made by those engaged in the more scientific part of agriculture. Of late there has been an effort, and a successful one, to place agriculture on a plane with other sciences. Dr. Gilbert, the first authority in England, said last year that the only hope for the future of agriculture lay in the larger adoption by our people of scientific methods. If this is true for England it will also, though perhaps not quite to the same degree, be true for Canada. This, remember, is the warning of a man who has a practical and scientific agricultural experience of more than fifty years. When we have such an expression from so high an authority, we may well see to it that we take every opportunity to gain information, and then endeavor as far as possible to make use of it upon our farms.

Now, it is a fact, about the truth of which there can be no doubt, although most of us have not the opportunities for making the observation for ourselves, that everything is changing. We ourselves are not composed of the same materials that we were some years ago. We may not see this change of material, but the scientist by careful methods of investigation may measure it.

The term matter as I shall use it, is anything that can be weighed. It may be in either one of three conditions. It may be either solid, liquid or gaseous. You say, is air matter? Certainly. If you take a vessel, such as a flask and weigh it and then exhaust the air, it will be found to weigh very much less. The air that the flask contained consequently had weight. The matter in this universe is constantly changing from one to another of these three conditions, and these changes are brought about by various causes, and very largely by the life functions of plants and animals. You say, are plants alive? Certainly, for they breathe, they require food, they reproduce. Plants are living organisms just as much as animals are, and we should do well to recognize that fact, it will help us in our practical agriculture—in the economical manuring of the land.

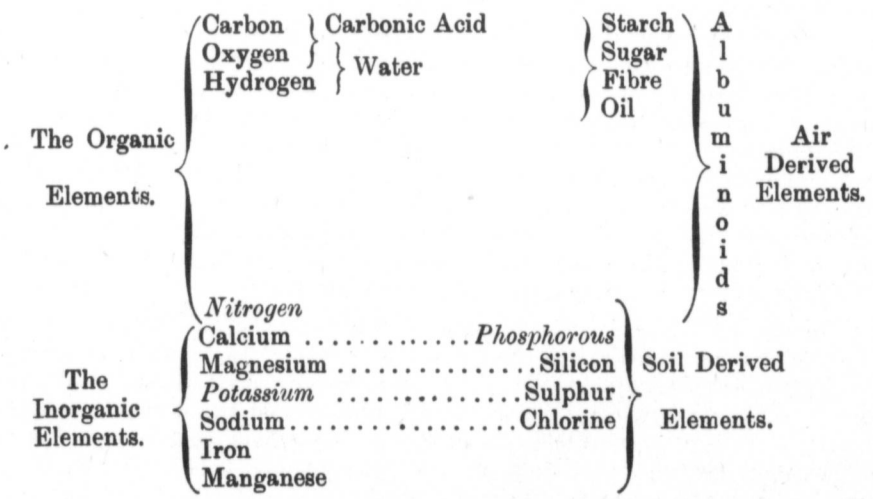
I have to make another statement with regard to matter, and that is that the farmer cannot create it or annihilate it. The sum total of the matter in the universe remains the same. You say to me when I put a stick of wood in the fire I get nothing after it is

burned but a few ashes. Is there no loss? Apparently so, but nevertheless there has been no loss, no annihilation of matter. It has changed its form. Part of the wood has been transformed into gaseous products, and if the operation had been performed in the laboratory we could have weighed them and shown that there had been no loss. So in one sense we may understand the farmers to be manufacturers, who, by the aid of plants and animals, convert the crude materials in nature into many forms useful for food and clothing. Just in so far as the farmer has skill in directing these changes just so far will his work be economically and profitably accomplished.

When a chemist examines matter, solid, liquid or gaseous, he finds that it is made up of certain fundamental forms known as elements, and that all matter in the world is composed of one, two or more of these elementary substances. As we meet it then in nature, matter is either elementary or compound, for the elements combine with one another in various proportions. There are some seventy or more of these elements. We as agriculturists have to deal with a few of them—some sixteen in all—and in relation to the plant food in soils I need only speak particularly of three.

Let us begin with the consideration of those elements which enter into the composition of the plant, because, as we shall see that the plant is an intermediate stage between the soil on the one hand and the animal on the other. From our standpoint plants may be said to have their special function in preparing food for the nourishment of animals. On this chart we have printed for us the names of those elements which go to make the matter of which plants are composed—carbon, nitrogen, oxygen and certain others.

PLANT CONSTITUENTS.



You will notice we have classified them under two groups—organic and inorganic. These then are the elements which in various combinations make up the tissues of plants, and since animals live on plants we find in them the same elements. Plants do not make or create anything; they only take up and convert matter taken in as food from the soil or atmosphere, or in the case of animals from plants. The particulars and data of the above chart were then discussed in detail.

Carbon is well known to you all, in the form of charcoal. It also occurs in the from of the diamond. Oxygen is a gas which is colourless and odourless, and exists in the atmosphere and in water. Of the former, it is one-fifth by volume; of the latter, it is one-third by volume. Oxygen is the great life-supporting element of nature. Without it there could be no animal life, no combustion. Hydrogen is not found in the atmosphere (except in the aqueous vapor present), but combined with oxygen is a chief constituent of water.

Nitrogen is a gas found associated with or mixed with oxygen to form the air. Four-fifth of the air is nitrogen. It, like oxygen, is colourless and odourless. The nitrogen in the atmosphere, however, has a different function to that of the oxygen. Oxygen is a gas which supports combustion, and enables us to use our food as fuel for keeping up the vital heat. Nitrogen, for the most part, appears to have for its chief function in the atmosphere the diluting of the oxygen.

We shall see, however, that nitrogen in combination is necessary to both plant and animal life.

Mineral Elements. With regard to the inorganic or mineral elements, we may say at once that so far as plants are concerned, they are obtained from the soil. Animals obtain their mineral matter from the vegetable foods they live on. These elements exist in the soil, combined with one another. Time will not allow us to day to consider these forms at length. They are present in the soil by reason of the disintegration and decomposition of the original rock masses, the resulting matter now constituting the greater part of the soil. The fact to be recognized is that when used as plant food they are soil-derived elements. Plants obtain their carbon from the carbonic acid (a compound of oxygen and carbon) present in the atmosphere. Hydrogen and oxygen are supplied to plants in the form of water. According to the class of plants considered, nitrogen is either soil-derived or taken from the atmosphere. For the majority of our farm crops it must be in the soil, where it forms an important constituent of the humus. If we take as an example of vegetable matter, a corn stalk and analyze it when it has come to maturity, we shall find that it contains about 73 lbs. of water, about 25 lbs. of organic matter, and in the neighborhood of 1 lb. of mineral matter or ash. Perhaps you will be the better able to understand what organic matter and mineral matter are if I tell you how it is possible for you to make a rough analysis and identify them for yourselves. Take a corn stalk and cut it up very fine, weigh out, say four ounces, and place on a plate in the oven or other hot place for several hours. What has happened? It has dried up; in other words, lost water, and now weighs (we will say) but one ounce. Therefore 75 per cent. (approximately) of the corn stalk is water. What have we left? The "dry matter." Let us pursue this analysis one step farther. Put the plate on the top of the stove or over the coals until the dry matter changes and finally disappears. What has happened? The organic matter has burned away, and that which is left behind is the mineral or inorganic matter, commonly known as "ash." We have now completed our experiment, and seen that the plant consists of three classes of constituents. We must now enquire from whence the plant obtains these constituents, which finally find their way into the milk pail in other forms or combinations.

A word or two with regard to the presence of water. I showed yesterday that pure water is essential for the maintenance of animal life. Water also is essential for the life of plants. We find that all plants take their nourishment either in the liquid or the gaseous form. All that plants require from the soil must be first in solution, or the plants cannot absorb it through the roots. The water which plants contain in such large quantities, therefore, has been taken from the soil by their roots. The water has descended in the form of rain and percolated through the soil.

Now, with regard to the organic matter, further processes of analysis would show us that it could be divided into two great classes, one of which consists entirely of the three elements, carbon, oxygen and hydrogen, and the other containing, in addition to these, a fourth element, nitrogen.

Let us consider, first of all, those which do *not* contain nitrogen. These are the fats or oils, fibre and carbohydrates. Only the last term requires explanatian. By carbohydrates we mean principally starch and sugar. From where does the plant obtain these? In a word, from the atmosphere. The original forms are present there as carbonic acid (a gas always to be found in the air, composed of oxygen and carbon), and vapour of water. These are taken in by the leaves and transformed by sunlight and the green colouring matter of plants into these organic substances. I have been speaking of carbonic acid as a gas exhaled from the lungs of animals. It is also formed when wood

burns in the stove. Nature has provided that plants shall use the waste products, if we may so call them, of animals; and thus you see her economy exemplified. Moreover we have seen that the greater part of the plant is made up of these air-derived elements. All the starch, sugar, oil and fibre comes from the air. The equilibrium in the atmosphere components, the purity of the atmosphere for the maintenance of animal life is thus maintained. To sum up, the green coloring matter which is contained in leaves, through the agency of sunlight, enables the plant to assimilate the carbonic acid gas which exists in the atmosphere, and then by certain life functions the plant forms from them very useful substances which serve as food for man and beast, viz., fibre, oil, sugar and starch. These differ but slightly among themselves as regards their chemical composition and their functions in the animal system, for they there serve to evolve the heat necessary for life.

Now, one word with regard to a class of organic substances which contain in addition to the constituents I have named, the element nitrogen. These are known as the "albuminoids" or "protein." Why have they received that name? Albumen, or the white of an egg, is a substance familiar to you all, and as these nitrogenous materials are very similar in composition to the white of an egg, they have been called albuminoids. We may consider them, therefore, whether occurring in the animal or vegetable kingdom, as very much akin in constitution and function to the albumen of white of egg. Similar substances are to be found in the lean of meat, the curd of milk, and also in the blood, and there are many other examples in the vegetable world which might be given. The gluten of wheat is one. The functions of the albuminoids in the animal economy are to repair the waste of the tissues and build up the muscle, bone and blood. They are necessary for the maintenance of life, for growth and development. Before leaving the question of nitrogen, I wish to refer to a question which was touched upon yesterday. You will see that I have placed this lower bracket in the chart so as to include the nitrogen, and consequently it is here to be considered as a soil-derived element, and I have also included this element in the upper bracket so as to show that it is also (in certain plants) an air-derived element. Now, some plants derive their nitrogen from the soil, others from the atmosphere. The first class may be known as soil nitrogen consumers. The larger number of farm crops are those which derive their nitrogen from the soil, and consequently we must recognize the fact that nitrogen in some form or other must be supplied to them in the soil. By such means only can we keep the soil fertile and get good crops. On the other hand, science has demonstrated that there is a class of plants that are able to assimilate and appropriate this free atmospheric nitrogen which we spoke of as being a mere diluent of the oxygen. What are these plants which can derive their nitrogenous nourishment from the atmosphere? They are known as the legumes, and include clover, lupines, peas, beans, etc. These by nodules formed on the roots which contain bacteria, have the power to appropriate this free nitrogen and convert it within their tissues into the most valuable of all food products—albuminoids. We may call these "soil nitrogen supplies."

To sum up and make one or two practical deductions from what I have said already. First of all, we have the larger part of the plant made up of water. We are abundantly supplied with water. We may, therefore, at once dismiss its consideration. Now, what do we find with regard to the fibre and sugar and oil of plants? We find they are made from carbonic acid and water, being converted from these materials by the life of the vegetable. Where were they obtained from? From the atmosphere. The large part, then, of matured plants consists of organic substances and water manufactured by the plant without any cost to the farmer.

Let us consider for a moment the case of the legumes. I have already pointed out that clover, peas and beans, have the power to assimilate the nitrogen of the atmosphere under certain favourable conditions. The growth of such crops leaves the soil richer in nitrogen than it was before, for the roots are rich in nitrogen. The lesson, therefore, to be learnt is that we should grow more of these crops and thus obtain a very nutritious fodder and a store of soil nitrogen for succeeding crops of cereals, grass or roots.

The chemist has further found that of all the elements that are required by plants, two others, viz: potash and phosphoric acid must be applied to the soil in addition to nitrogen if we would maintain fertility. For potash, I can strongly recommend wood ashes. Muriate of potash and kainit are also very valuable forms of potash. To supply phosphoric acid, bone meal and superphosphate should be used. All the other elements, save, perhaps lime, may be said to exist in sufficient quantities for all farm crops. We may conclude this part of my subject by saying that the farmer and dairyman must see to it that the soil is supplied with available forms of nitrogen, potash and phosphoric acid.

The plant stands between the soil and the animal kingdom. It elaborates, as I have described to you, albuminoids, starch, sugar, fibre, oils, and these are used by the animal to give strength, to develop vital heat, to build up the tissues of the body, to produce milk, wool, and so on. How these changes take place we may not stop to enquire, but in different forms we may recognize in the products of animal life the elements that once existed in the soil and in the atmosphere. Upon this chart I have indicated the percentage composition of dairy products, viz: of milk, cheese, whey, butter, butter-milk and skimmed milk. I brought it before the Association last year, but in this connection will bear repetition.

PERCENTAGE COMPOSITION OF DAIRY PRODUCTS.

Constituent.	Milk.	Cheese.	Whey.	Butter.	Butter-milk.	Skim-milk.
Water	87.5	30.0	93.1	15.0	90.4	90.3
Albuminoids	3.2	28.0	.9	.5	3.2	3.6
Fat	3.8	34.5	.4	82.4	.2	.2
Milk-sugar	4.8	2.0	5.0	.....	5.5	5.1
Ash	.7	.7*	.6	.1*	.7	.8

First of all, with regard to the organic substances of which we have spoken, let us see where they re-appear in the animal kingdom and more particularly in these dairy products. Sugar exists in milk as milk sugar. Oil re-appears in milk as butter-fat. With regard to albuminoids, we find them appearing in milk as the casein. This latter is the organic material which contains the nitrogen, and one of its chief functions, when milk or its product cheese is used as food, is as a flesh former. The water appears in the dairy products as water. In regard to the mineral matter, although in different proportions it is yet composed of very much the same ingredients as we find in the ash of plants. We must be struck with the similarity between plant and animal composition.

This chart so well expresses the composition of dairy products that I shall not on this occassion dwell at any length on that very interesting and practical part of my subject.

Of milk we may say that is the very best type that could be selected to illustrate a perfect food. All the constituents for the various wants of the body are present and present in an easily assimilable condition. The milk of different cows and of the same cow is apt to vary in the percentage of solids and more particularly of fat. There are, however, certain limits below which the solids and fat of milk of herds should not fall. The fat in milk is a measure of its value for consumption in the household, for butter and for cheese making, hence the importance of having a cheap and reliable means like the Babcock for estimating the fat.

Cheese is very highly nutritious. It contains large percentages of flesh forming and heat giving constituents, viz: casein and butter-fat.

*The differences that occur in the case of cheese and butter, between the total amounts of the constituents and 100, correspond to the percentages of common salt added in the process of manufacture.

Whey is poor in fat and casein, containing about half a per cent. of the former and nearly one per cent. of the latter as a soluble albuminoid. It has about five per cent. of milk-sugar and some mineral matter; the former gives whey its chief value as a food for pigs. It must, however, be supplemented by foods stronger and richer.

Butter is chiefly composed of the fat of milk, though from fifteen per cent. to twenty per cent. consists of water, salt and traces of curd. Butter-milk differs chiefly from milk in the practical absence of fat and in that part of its sugar has been converted into lactic acid. It is much more valuable as a food than whey because it contains the nitrogenous (casein) constituents of milk.

Skim-milk if fresh from the separator is simply milk unchanged save for the removal of its butter fat. Skim-milk from deep or shallow pans contains more butter fat than that from the separator, though it is seldom found as fresh as the latter. Skim-milk is an excellent food, and needs only to be supplemented by oil cake or linseed to furnish fat.

With what I have told you it will be quite easy for you to trace for yourselves where the various constituents of milk re-appear in its products. Further, you know now why it is necessary to supplement whey and skim-milk when used as foods and what the character of the supplementary foods should be.

Mr. MURPHY: Is not the value of skimmed milk and butter-milk about the same?

Mr. SHUTT: There is not very much difference. Much would depend upon whether a separator was used. Fresh skim-milk, however, is the more nutritious of the two, since butter-milk contains much of its milk sugar as lactic acid. On the other hand, careless churning may leave a good deal of butter-fat in the butter-milk, and thus increase the value of the latter as a food. Skim-milk may contain half a per cent. more of flesh forming constituents than butter-milk. The chief difference between butter-milk and skim-milk is that the skim-milk contains more of these nitrogenous constituents than the butter-milk. Butter-milk is far more apt to vary in its composition than skim-milk from the separator.

MR. MURPHY: Then skim-milk would be of more value to the farmer when coming fresh from the separator than butter-milk as feed for hogs?

Mr. SHUTT: Yes. It should, however, be supplemented by some food supplying fat. You will then have a balanced food, one in which all the constituents for the various wants of the body are present—a food easy of digestion and assimilation.

ELECTION OF OFFICERS.

Mr. R. J. GRAHAM presented the report of the Nominating Committee, and moved its adoption, seconded by Mr. Murphy. The motion was unanimously carried. The list of officers will be found on page 182 of this Report.

Mr. D. DERBYSHIRE, Brockville, in acknowledgement of the continued confidence shown towards him by the Association in re-electing him as President, said: I thank you, gentlemen, for this vote of confidence, and I assure you that I accept the position of President again in the spirit which has led you to offer it to me. I have done the very best I possibly could to forward the creamery business in the Province of Ontario. Anything that I could do to make it valuable I have done, and all the directors associated with me have also done all they could to help the dairymen in every possible way. I am sure any who have listened to the addresses during the past two days will admit that we have been careful in the selection of speakers for this meeting. We will promise you that even better things will be done if possible in the future than has been done in the past. (Applause.)

The convention adjourned till 8 p.m.

SECOND DAY—EVENING SESSION.

His Worship Mayor MULHERN, who occupied the chair at this session, opened the proceedings with a few well-timed remarks. The audience was the largest during the convention, filling every part of the commodious hall. Between the addresses the Knox Church quartette, of Cornwall, rendered an excellent programme of music, which added greatly to the evening's enjoyment.

BREAD AND BUTTER.

Prof. ROBERTSON was the first speaker of the evening. He delivered an exceedingly valuable address on the subject of "Bread and Butter," which has been incorporated in the report of the Eastern Dairymen's Association. (See page 41.)

EDUCATION OF THE FARMER.

Prof. BROOKS came next, his subject being as above. He said: Seldom in these days of keen competition does the seller obtain what he would like for that which he produces. Human inventions, enterprise and industry, in the race for wealth, have largely revolutionized the industrial and business world. One man's labor, year by year, in most lines of effort, produces more and more. An inevitable consequence is falling prices. Under these conditions one of the most natural consequences is effort on the part of the producer to uphold or raise prices. Hence trusts and combinations are formed, efforts to curtail production are put forth. In some lines of manufacturing industry these movements often seem to be attended for a time with a considerable measure of success, but the failures are far more numerous than the successes. Except remarkable ability be enlisted in such enterprises, or legislation be secured which favors monopoly, such measures are fore-doomed to early failure, for they are grounded in opposition to natural laws; and though, for a time, under the most favorable conditions with such ability and legislation, successful, all monopolies in this age of general enlightment and democracy are sure to fail. The love of liberty and justice, the spirit of manhood and the energy of the Anglo Saxon race are too great to tamely submit to oppression. Shall peoples who, both in the old country and the new—from the days of "Magna Charta" to the present, have little by little freed themselves from the oppressions of the past—oppressions founded on birth and aristocracy, supinely submit to the infinitely worse oppression of wealth? The answer springs from every heart, surges through every pulse; it leaps to all our lips—"No, ten thousand times, no!"

But even were combinations to raise prices not repugnant to all our nobler instincts, such combinations would yet be almost an impossibility in most lines of husbandry. Those engaged in most branches of agricultural production are too numerous, too widely scattered, effectively to combine for such purposes. So little capital, relatively speaking, is required to become a producer in agriculture, that a combination once formed must soon face formidable outside competition. Let us, then, brother farmers, recognize these facts at the outset. Let us cease to devote so much attention to the market end of the line. This is largely beyond our control, and must ever remain so. The great law of supply and demand will work its legitimate effects in spite of our puny efforts to prevent. Of course, in what I have said, I have no intention to counsel against the exercise of the utmost business knowledge, sense, shrewdness and energy, in the effort to secure as large as possible a share of the price the final consumer pays; but let not even this effort

engross too large a share of our energies. The other end of the line—the producing end—is more largely under our control. Let us produce what is wanted, and at the lowest possible cost, and of our success there can be no doubt if we bring to the undertaking the knowledge which I believe is within the reach of all.

Economy in production, the prevention of wastes, should then be our watchwords. Let me enlarge upon this theme, for its consideration emphasizes as nothing else can the necessity of education for the farmer. Right here, we farmers may learn a lesson from our brother manufacturers, for we are manufacturers as truly as those ordinarily called such.

The manufacturer has been quick to learn the lessons of the times to adapt himself to the new conditions. By increased use of machinery, more thorough systemization of his business in all directions; and (here is the point to which I would draw particular attention) by avoiding all wastes, so soon as human knowledge points the way, he is continually reducing the cost of his product. Let me call your attention to a few instances illustrative especially of the last named point.

The manufacturer of flour from wheat furnishes a good example. Only a few years ago the method in use was essentially comprised in two processes. First, the grain, skin as well as starchy interior, was ground to a meal; and second, this meal was bolted (sifted) through fine silk reels in the effort to separate skin (bran) from flour. Much of the skin having been finely divided between the mill-stones, the process was unsatisfactory in two directions. First, some of the more finely divided particles of the skin passed through the reels with the flour, giving it a dark color; and second, considerable of the flour in the shape of impalpable dust adhered to the bran and was lost to the flour barrel. The "gradual reduction" process, first employing sets of rollars, working at constantly increasing degress of closeness, was invented. The kernels of wheat instead of being ground are crushed ever closer and closer as they pass from one pair of rolls to another. At each stage a portion of the starchy interior is separated, the germ is extracted. Meanwhile the skin is broken comparatively little, and leaving the last pair of rollers in large thin flakes from which the mighty pressure has loosened all adhering parts of the grain which are fit for flour and passing through the reel in which this flour is sifted out, this skin goes, you are thinking, perhaps, to the bins for bran. But no, the miller is not satisfied even yet; adhering to the flakes of bran is considerable dust;—the finest flour dust, and this he must save. So the bran is led to an ingenious machine—the "bran duster." Here it passes on to an endless apron reel in the thinnest possible layer; and as it moves along, a gentle blast of air acting upon it keeps the particles gently dancing and as it dances turning successively all sides to the gentle zephyr, this flour dust is separated and goes to help fill the barrel.

The recent discovery of the agricultural value of the slag from the furnaces where Bessemer steel is made—furnishing as it does an extremely valuable phosphate; the production of sulphate of ammonia in connection with the manufacture of illuminating gas, beet-sugar, coke and bone-charcoal; and the recovery of potash from the washings of wool are other examples of the careful attention to economy on the part of manufacturers which should be of particular interest to farmers.

Of all branches of human industry farming, I believe, is the one in which there are most wastes. In this statement I would not be understood to imply that farmers are less appreciative of the importance of preventing wastes than those who are engaged in other industries. For thorough going economy, in so far as he sees the way to it, commend me to a New England or Canadian farmer. If he is to be at all criticized in this connection, it is, perhaps, because he is sometimes a little slow in looking for more light as to methods,—a little too apt to suppose that he "knows it all."

"Knows it all!" What an expression! Nobody does or can "know it all." "All" has not been learned, and never will be. We have made wonderful progress, it is true, in agricultural knowledge during the last fifty years; but the knowledge of even the wisest is, I often think, abysmal darkness in comparison with *all*. Let us consider a few of the things which might perhaps be accomplished if we *knew it all*. The plant food in

one hundred bushels of potatoes can be purchased in the very best forms for rather less than five dollars: yet I know intelligent farmers who assert that they are unable to get back even the money expended for fertilizers used for that crop. If we "knew it all," though we should doubtless require a considerable plant-food capital in the soil, we might hope to raise potatoes with an annual expenditure for fertilizers of about five dollars for each one hundred bushels. No one knows enough to do this now, and at the same time maintain his soil capital intact. Calculation shows that the important elements of plant food in one hundred bushels of corn can be bought for about twenty three dollars, those in a ton of English hay for less than eight dollars. No one knows how certainly to produce these crops with these expenditures.

In one hundred cans of milk there are but about ten pounds of nitrogen. This in forms suitable for the food of plants costs about $1.50. Who knows how to use the nitrogen, which can be bought for $1.50, first to produce the plants for the food of the cow, and second, to feed these plants to the cow so that she shall produce even one-quarter of one hundred cans of milk. True it is not to be expected that we shall ever be able to recover all of this nitrogen, first intrusted to the soil, in the form of milk; but is the necessary loss more than three-quarters of the whole? On the contrary, science now points the way—by cultivation of legumes under appropriate conditions—in which the dairyman should put into his milk cans more nitrogen than he buys in the fertilizer bag. Still I venture the assertion, there is not a farmer in my audience who can do this.

The potash and phosphates in one hundred eight and a half quart cans of milk can be purchased in fertilizers for thirty-four cents. No one knows enough to transfer them through soil and crop—and the cow's mouth—to the milk pail without enormous loss.

All the plant food in one ton of butter can be purchased for less than one-half a dollar. The aggregate of such food in one ton of well-made butter is only about four pounds. Should not the butter dairyman be able to carry on his farming operations without diminishing the fertility of his fields? How many farmers do this? How many *know how to do it?* Do not these facts and thoughts emphasize the need of education for the farmer?

It is undoubtedly true that the necessary wastes in farming, because of deficiency in knowledge of even the wisest, are as yet considerable, but the necessary are small in comparison with the preventable wastes,—wastes which will be prevented when knowledge of the methods is generally diffused. Farmers are often accused, unjustly, I am assured, of old-fogyism, of clinging to precedent, of backwardness in making improvements. My experience leads me to acquit them of these faults. They are not speculative, they possess and act upon the dictates of a wise conservativism: but point the way to improvements and they are quick to follow. You would travel far on my side of the imaginary line that divides us, and I doubt not on yours, too, to find a second farmer who would manifest the spirit illustrated by an incident said to be of recent occurence to which you will pardon me for calling your attention.

The party vouching for the authenticity of this occurrence is an agent for wind-mills, and we will tell the story as nearly as possible in his own words:

"Curious fellows, those Waybcak farmers are; droll chaps to deal with, too; cute and sharp at a bargain. Most of them know a good thing when they see it, so I took a good many orders; but once in a while I come across a conservative old hayseed whose eyes are closed to anything modern. One of that sort helped me to a good laugh the other day, and I might as well pass it on.

"He was a genial, white-headed old fellow, who owned several fine farms, with prime orchards and meadows, barns and fences in apple-pie order, and dwellings serene in comfort.

"He listened closely while I explained and expatiated on the utility and excellence of our special make of machines; then taking a fresh supply of Cavendish, he squared himself in his chair, with his hands in his pockets, and held forth in this fashion:

"'Waal, stranger,' he said, 'your machine may be all right; but now see here. I settled here in the airly fifties, broke the trail for the last few miles, blazin' the trees as we came along. I had a fair start, good health, a yoke o' cattle, a cow, an axe, with one

bit an' three coppers in my pocket. I built a log house with a shake ruff an' a puncheon floor, an' a cow shed of popple poles ruffed with sod. I worked hard, up airly an' down late, clearin' up land by degrees, an' diggin' a livin' out o' the sile by main strength, an' no favors except the blessin' o' the Almighty. The Lord's been good to me. He's gi'n me houses an' barns; He's gi'n me horses an' cattle; He's gi'n me sheep an' swine, an' fethered fowl o' many kinds. An' now, stranger, after all that, I'll be everlastingly durned if I'll be so mean as to ask Him to pump water for 'em.'

"'And then,' continued the story teller, 'he brought his hand down on his knee with a whack that fairly echoed through the house. Of course I couldn't urge him to purchase after that expression of his sentiments, and I left him. Independent wasn't he?"

This story, you will recognize, is in the usual vein. It begins with, "way-back farmers" and "old hay-seed"; and illustrates, therefore, not alone the spirit from which, I hold, you as a class are generally entirely free, but as well the popular idea still so frequently held concerning us.

Both the "spirit" which the old farmer is made to illustrate and the popular idea of which the story is evidence can best be got rid of by education.

What I have thus far said makes evident my idea as to what should be the prime object in view in the education of the farmer. This is a practical age; the farmer faces practical and vital problems. His education must be directed primarily to the throwing of light upon these problems. Education, however, which should comprise only work of this class, useful as it is, would fall far short of the ideal which we should keep ever in view. A knowledge of facts and principles related to his business is necessary, and the education of the farmer should impart such knowledge; but the *full, broad scheme* of education should aim to *develop the man*, to awaken his faculties, to *strenthen his mental powers;* to raise in him a thirst for knowledge, a *love* of study; and to show him *how* to study.

Emerson somewhere says: "You should hitch your wagon to a star." Yes, our ideals should be high, they cannot be too high, provided we are wise in our efforts to realize them. Let us not think, however, to reach the "stars" by one grand flight: our path to them must be difficult and long. We must not wholly confine our attention to the distant goal; we must study that part of the road leading toward it which lies immediately before us.

Approaching my subject with these principles of action prominently in mind, with the determination to make its discussion practically helpful in so far as time and abilities permit; the thought at once obtrudes itself: "We shall not all reach the goal." Of the soldiers who, full of life and hope enter the battle, alas, some must fall by the way. Our problem is the education, the advancement of the agricultural classes. But at the very beginning of the road, almost at the foot of the hill of knowledge stand many who have long passed the morning of life. How shall we help, how and to what extent can we educate these? Clearly our subject must be sub-divided; the methods suited to mature men—men in most cases dependent upon their own efforts—not simply for their own support but for the support of wives and children as well, are not the methods which will be best for the young. The education of these mature men must be mainly practical; a bread and butter education; directed chiefly to imparting a knowledge of those things which will enable them to produce a better article at less cost. But even so, it is not satisfied with imparting simply empirical rules and principles of action. Circumstances are so infinitely varied that he who has no knowledge of principles is at an enormous disadvantage. These principles must, however, be presented plainly and practically; and in imparting them laboratory methods, in so far as may be possible, should be followed. The travelling dairy schools admirably illustrate such methods; and your knowledge of these schools, their management and their results, fortunately renders detailed discussion of this matter unnecessary. In the particular field which the managers of these schools aim to occupy, they leave little to be desired. Dairying, however, is but one, though a very important one, of many lines of agricultural effort. The field,

therefore, is much broader than is covered by these dairy schools; how broad any intelligent man who has thoughtfully followed any branch of farming well knows. How many times questions urgently requiring solution and involving how wide a range of human knowledge present themselves,—questions which unfortunately not even the wisest can always answer!

Oliver Wendell Holmes has pithily said: "To succeed in life, one must know something about everything and everything about something." Surely in no pursuit is this more true than in farming, dealing at every step as it does with nature and the secrets of nature. It will be readily recognized, then, that the problems to be solved in the effort to give helpful education to these busy mature men must be many and difficult. In the first place there is the problem of time. These men as a rule can spare but little time away from the exacting duties of home; and that only at favorable seasons.

The agricultural periodicals and the many useful books and other publications on agricultural subjects help greatly in this work and they have the great advantage that they can be taken into the home. While, however, they are highly useful if studied aright, it is to be feared that in far too many instances they make little impression—not because the matter therein is not good—but because there is a lack of concentrated and continuous effort in any one direction. If we would make an impression upon iron we must strike repeatedly in the same spot. By so doing we can leave a lasting impression—we can shape it at will. So it is with mind. The habit of weekly going through an agricultural paper, treating briefly of a hnndred different topics and of each in a fragmentary and necessarily superficial way, while it may result in the acquisition of occasional useful facts and principles, does not strengthen the mind, does not give new power, and is not education in any true sense of the word. It tends towards "some knowledge of everything"—not to "all knowledge of something," which is the more useful of the two.

And yet the number of hours which can be and usually is spared during a year in this desultory reading is considerable. If directed wisely and systematically towards the acquisition of a thorough and definite knowledge of *something*, the end of the year would find the reader distinctly further on the road to learning than at its beginning, and with added power of study.

Few, however, have the power to select and read wisely by themselves. Few have the persistence to follow unaided a definite line of study. An adaptation of the Chatauquan system can help us here.

A few of our agricultural colleges have already made a move in that direction; and have established courses of reading for farmers, which have been helpful to many. This is a branch of university extension work which might be more generally adopted with great advantage.

There are many, however, among farmers as in other classes, who have little taste for books. They derive no inspiration from them. For such, especially, and to a considerable extent for all, the living presence and voice is better. Hence such conventions as this; and hence the various modifications of what we in the United States usually designate institute work. Institute work, in some States, is conducted under the general management of the Boards of Agriculture. In others the Agricultural Colleges take the lead; but whether nominally in charge or otherwise, since the Agricultural Colleges furnish the larger share of the speakers, this institute work should be regarded as a branch of university extension.

This work, while making for progress on the whole, is attended with very varying and, as I have observed it at least, in many instances rather discouraging results. The attendance is uneven. In some localities large, enthusiastic and inquiring audiences greet the speakers and the discussions following the addresses are animated and helpful. In far too many instances, the audiences are small, no matter how able the speakers. This failure to secure an audience is doubtless in many cases due to shortcomings in the management which is usually vested in the officers of the local agricultural society. When this

society is vigorous and well officered, and where a local Grange co-operates with the officers of a society, the institutes as a rule are highly successful. The Grange enlists the ladies and thus secures to a far greater degree than is otherwise usually possible, the assistance of an element of society which no community can afford to neglect. Time will not allow me to discuss the Grange at any length; but, although not a member, I desire to remark in passing, that in countless ways other than the one mentioned, the Grange serves as a centre for education. With us it is an exceedingly important educational factor; and closely allied to the Grange in educational and social methods must be mentioned the farmers' clubs, so often of great educational value to their members.

It appears to me that the institute as usually managed is open in considerable measure to the criticism I have made regarding the usual use of agricultural periodicals and other literature; and this is true even when they are the most successful. In them there is a lack of sustained effort in any one direction. At one meeting this subject or several subjects; at the next another subject or subjects and so on from year to year. Can it be wondered that upon many of those attending the effect is slight?

Speaking of the instruction of the farmer in agriculture, in a report upon the Agricultural College of Massachusetts, a member of our Board of Agriculture recently said: "It must be brought home by the living voice and presence; experts must meet the people face to face, and talk familiarly about those things which deeply interest both. What better fountain for such streams of influence than the State institution at Amherst? Let them be designated as they may,—'popular,' 'conversational,' 'familar lectures,' 'institute work,' or, more properly, as conforming to advanced methods and as boldly proclaiming the faith and policy of their source, 'university extension'; professors and teachers from this centre during the farmer's winter leisure should go abroad in the Commonwealth, organizing in the cities or larger towns and in rural centres special courses of instruction suited to the needs of practical farmers, and thus create in a sense an itinerant college. But, it is objected, this would involve the necessity of a larger teaching force and increased expenditure. Be it so. Multiplying needs and a widening field are evidences of growing intelligence and higher standards; and Massachusetts, ever in the van of educational progress, will be the last to shrink from responsibilities imposed by success, or to regard with disfavor such drafts upon her bounty."

I have given this quotation because it suggests what I regard as a needed modification in institute work. Observe the form of expression "organizing * * * * courses of instruction suited to the needs of practical farmers." Here you see is the idea of continuous correlated work—"courses"—implying concentration, repeated blows which alone produce much effect: and I may remark that this expression of opinion carries with it the greater weight, coming as it does from a teacher of much experience.

With such courses there will still be a field for the occasional institute—"Something about everything," we need; but without the "courses" we shall fall far short of learning "everything about something."

One modification of institute work, the "field" meeting or institute must always prove useful. Held, as such meetings always are, upon farms exemplying in some direction at least, a high standard of agricultural attainment, they furnish object lessons which do much to arouse the spirit which means progress.

In line with the "courses of study" in "itinerant colleges," and in some respects superior to them are the short winter courses which so many of our agricultural colleges are now offering. These courses are, it is true, to a considerable extent attended by young men as well as the mature and so to a lesser degree are the institutes: but I believe that we should aim to hold the younger men for longer courses; and that these short winter courses as well as the institutes or "itinerant colleges" should be planned with especial reference to the requirements of older and busy men who must perforce be satisfied with less than we should all determine to give our boys—less than all boys should determine to have for themselves.

Short winter courses at the seats of the various agricultural colleges cover the entire field of agriculture. The attempt is made to adapt them to the peculiar lines of farming prominent in the several States. Dairying, live stock husbandry, fruit culture, floriculture, market gardening, are a few of the more specialized courses. Then there are offered courses in more general lines, including the study of soils, manures aud fertilizers, drainage, etc.

These courses possess one great advantage over the "itinerant courses," viz., being conducted at the agricultural colleges, use can be made of the many facilities for educational purposes collected there. The barns and stables and the representatives of the various breeds of live stock usually found in them; the hot-houses and their contents; the well-equipped laboratories; the museums, the charts and maps; the experimental departments with their many facilities for investigation, and last, and perhaps the most important of all, the libraries, are among the more prominent of such facilities. Then, too, the same men who are employed in teaching in the more strictly collegiate courses, can do a considerable share of the extra work involved in these short courses without neglecting their regular work.

On the other hand there is the disadvantage that many who might attend such courses were they offered near their homes will consider attendance not feasible if they must take up residence at a distant place. If "Mahomet can not or will not come to the mountain, then it is best that the mountain go to Mahomet."

Results with us abundantly demonstrate that the short winter courses at the colleges are filling an important field. They are largely attended—especially the dairy courses—possibly because recent advances in methods of dairying have been so great and so rapid. Those attending them range from sixteen to seventy years of age, and there is a considerable percentage of married men among them. Professor Plumb, director of the Agricultural Experiment Station in Indiana, writing of these courses, has recently said: "Unquestionably the short-course students in the agricultural colleges are unusually devoted to their studies, and have a desire to gain information that must be a pleasure to the instructor interested in his work. When men seventy years of age will leave their work at home and attend college for two or three months in the winter to gain more and better information concerning their business it indicates that the work being done must have met their commendation in no common degree." There appears to be an important field, then, for both of these classes of "short farmers' winter courses."

Having now considered the methods which have been and may be useful, more particularly in the education of the older farmers, though to a considerable degree helpful to many young men and women as well, we may pass on to a consideration of the measures which have been and may be taken for the education of the young men and women who are to become farmers and farmers' wives. Holmes has said that "A man's education should begin with his grandfather"; and we have the best of authority for the belief that "the child is father to the man." Let us, then, recognize at the start that, since the "grandfather" has usually got beyond us, we shall certainly act wisely to do the best possible under the circumstances and begin with the child.

Yes, begin with the children in the public schools. Unfortunately I am not familiar with the methods and results of public school work in the Dominion; but as regards the United States, I thoroughly believe that as a rule the tendency of the training, in even those public schools which the farmer chiefly has supported, has been to educate away from the farm. There are, of course, other agencies at work, but I believe the country schools may be made to do much to counteract the great and ever increasing rush towards the cities and large towns. At the close of the last century only about five per cent. of the population of the United States was found in towns of more than ten thousand inhabitants. The close of the present century will find about one-half of our total population in cities.

This transfer of population, it is true, is not altogether undesirable. Machinery in agriculture has immensely enhanced productive capacity. A far smaller proportion of our population than formerly can produce agricultural necessities for all, and the larger

the proportion of non agricultural citizens, provided such citizens are prosperous, the better the markets for the products of the farm. I do, however, know that many a life is rendered less useful and less happy, that many a life is ruined as a result of the mad race for wealth in cities and towns—lives which with proper educational influences in early life might have been productive and happy. The over-crowded ranks in business and trades and the increasing numbers in almshouses, insane asylums and prisons bear most conclusive testimony to the fact that in the various non-agricultural pursuits of life success is not to be easily attained. And it should be remembered that when the struggle results—as alas it often does—in failure, a burden is imposed upon the productive classes—a burden of taxation, of which the farmer often bears the lion's share, which makes his life the harder.

No, it is not well that so many should leave the farm. All legitimate influences should be brought to bear against this tendency of the times. We all agree with Goldsmith in the sentiments expressed in the oft-quoted lines:

"Ill fares the land, to hastening ills a prey,
Where wealth accumulates and men decay;
Princes and lords may flourish, or may fade—
A breath can make them, as a breath has made—
But a bold peasantry, their country's pride,
When once destroyed can never be supplied."

Time will not allow me to work out the details of common school work, nor is it necessary, for each community must to a large extent work them out for itself; but I would make emphatic the expression of my conviction that the agricultural education of farmers and farmers' wives should begin in the common schools. But a very small percentage of our youth ever go beyond these schools, and yet the training in them has been largely shaped with reference to the supposed requirements of those who were being fitted for college. It is time that we called a halt. Let us teach in the schools those things which relate to life; in the country those things which relate to country life—the rocks, the soil, the air, the animal, the insect and the plant; and everywhere those things which relate to our globe in its larger relations—to the sun, the moon and the stars; those things which relate to the nations and their history, to society, to business, to literature and to man; and let all be taught to develop manhood and womanhood; the power to study, to think and to reason.

The celebrated "committee of ten" appointed to consider secondary school studies in the United States, in a measure recognizes the desirability of changes such as I have suggested, but, composed as the majority was of men who were connected with colleges, it cannot be wondered that in their recommendations the preparation for college is kept prominently in view. True, an effort is made to adapt the work in the elementary and secondary schools to preparation for life as well as for college, but to me it seems that life, the factor which concerns all most vitally, is still to too great a degree made subordinate to college.

Still the introduction of "nature studies," manual training, sewing, cooking, etc., are steps in the right direction.

Beyond the public schools, we in the United States, as you doubtless all know, have a large number of agricultural colleges and schools, established and in part supported by grants of public lands and money by the general Government; each State has at least one such school or college. These are by no means entirely supported by the general Government. The several States have for the most part contributed largely to the equipment and support of their own colleges and schools of agriculture, and most of them make annual grants of money for their maintenance, improvement and support. Naturally the amounts thus contributed by the States vary widely as the necessity varies. Massachusetts, though only about one-fifth of her people are engaged in agriculture, has been liberal in her grants to her agricultural college. Since it was established in 1866 she has given it appropriations aggregating about $750,000. She now makes regular annual appropriations amounting to $30,000. All our buildings, of an aggregate value of

$265,000, have been erected at her expense. From invested funds derived almost entirely from money granted by the general Government, and from annual grants by that Government we draw annually for educational and experimental purposes the sum of $42,000, making our aggregate annual income about $77,000. Into the particulars concerning the support of our other agricultural institutions I will not go. It suffices to know that the funds are derived both from the State and the United States or general Government funds in all cases.

Most of the States have but one agricultural college. With this is combined a mechanical or engineering department in almost all cases. These colleges are generally designated agricultural and mechanical colleges; but the number of students in the engineering departments invariably largely exceeds the number in the agricultural department. In a considerable number of States the funds received from the general Government were given to an already existing college or university on consideration of its establishing an agricultural course as well as engineering courses where these did not already exist. Thus in New England these funds were turned over to Dartmouth College in New Hampshire, to Yale University in Connecticut, to Brown University in Rhode Island, and to the University of Vermont in the State of Vermont. In New York, Cornell University was founded with these funds, in Pennsylvania an Agricultural and Mechanical College, in New Jersey the money went to Rutger's College, and so throughout the Union in almost all the States.

In Massachusetts, the funds received from the general Government were divided, two-thirds of the amount was given to the agricultural college established at Amherst and one-third to the Institute of Technology in Boston. Results have abundantly vindicated the wisdom of this course. Though Massachusetts is not looked upon as an agricultural state—though only about one-fifth of our citizens, as I have said, are engaged in agriculture, we have more agricultural students in collegiate courses than in any other State. During the year 1894, no less than 206 agricultural students were connected with the college, and the average number of undergraduate students was about 160. We offered two courses in agriculture, one a four-year course, the other a two-year course. The number of students taking the longer course was 115. The two-year course was first offered in 1893.

Let us make a few comparisons, for which purpose I will select some of our largest and most populous agricultural states. New York in eight years, 1886 to 1893, graduated 43 students in agriculture out of a total of 1,348 graduated; Pennsylvania in 1893 had one student in agriculture out of a total of 200; Ohio, in 1893, out of a total of 83, graduated one in agriculture; Wisconsin in 1894 had 5 in her four-year course in agriculture and 102 in her two-year course; Iowa, in 1891, out of a total of 39, graduated one in agriculture; Illinois, in 1893, had 7 students in agriculture, and Indiana, in 1892, had 18. In all these States the agricultural course is but one of several courses offered—courses in engineering, architecture and mining, and letters and art as well, in many cases.

In making these comparisons, it is not at all my purpose to demonstrate superior wisdom on the part of Massachusetts, for the separate establishment of a purely agricultural college there was largely the result of accidental conditions—existing conditions, not conditions produced by design. My object is simply to bring out clearly the fact that collegiate courses in agriculture have not been successful with us when made parallel with courses in letters and arts, in engineering, etc.

The reasons why this should be the case I have not time to discuss; but I may say in passing that undoubtedly the arrogation of superiority to the agricultural students on the part of those in other courses, an arrogation which they find it the easier to support because of the still too common estimate in which farming, as compared with the so-called learned professions, is held, is the most important single factor.

Were additional evidence of the impolicy of making an agricultural course a branch of an established college or university needed, the experience in the New England States where it was tried would be convincing. Neither at Dartmouth, Brown nor Yale did any

considerable number of agricultural students ever present themselves; and within a few years the college of agriculture in each of the States concerned has been divorced from the older college or university.

There is one apparent exception in the United States to the general rule, that agricultural courses are not successful if established parallel with other courses. This is furnished in Michigan, where both the agricultural and engineering courses were made a part of the same institution. In Michigan there has always been a good number of agricultural students, while in other States where this combination has been tried the agricultural course has been almost a complete failure.

The different result in Michigan is undoubtedly to be ascribed in large measure to superior wisdom in management. One point in particular deserves attention. In Michigan the students in engineering and other courses are required to work as many hours in the shops, at the forge, lathe, etc., as are required of the agricultural students in the field, garden, plant houses, barns, etc. This may seem a trifling matter, but in the eyes of young men and young women it appears important; and further, the knowledge of this single regulation gives us an important hint of the spirit which has dominated in Michigan—a spirit born of a determination to give both courses a strictly equal chance. It is to be feared that in too many instances this spirit has not prevailed.

It may seem, therefore, that an agricultural course may be made successful side by side with other courses; but when we consider that Michigan, one of our largest agricultural States, with about seven times the area and five or six times the agricultural population of Massachusetts, has less agricultural students than the latter State, we can but look upon this fact as strong presumptive evidence that even when otherwise under the wisest management it is better that an agricultural course should be established by itself.

Let me attempt in conclusion, in the fewest words possible, to give you an idea of the equipment and work at Amherst and its results. The Massaehusetts college is purely an agricultural college. It is located upon an estate of about four hundred acres, comprising a wide variety of soils as regards elevation, aspect, drainage and physical and chemical characters. It includes beautiful natural forest, mowings, tillage, orchards, vineyards, gardens and ornamental grounds. We have extensive greenhouses, model barns and stables, laboratories, museums, library and dormitories. We have a good working equipment in live stock, plants, models, apparatus and charts of all kinds. We have a faculty of seventeen men.

We offered but one course, covering four years, and this course was the same for all up to the year 1893. From the fall of that year all studies except military science (required by the United States Government) and training in the use of the English language have been elective in the last year of the course. Besides all branches of agriculture, fruit culture, floriculture and gardening, this course embraces study of the following subjects:—Chemistry, botany, zoology, entomology, veterinary science, mechanics, physics, and mathematics, all taught with especial reference to agriculture; and French and German (Latin has been substituted for German a part of the time). Students entering upon this course must now be at least sixteen years of age. Up to 1894 the age limit was one year less.

Speaking of the results of the work in the college in 1892, I presented a summary to which I ask a few moments' attention.

Since the college opened its doors to students, in the fall of 1867, it has received within its walls (not including students now in college) 879 men. We have at the present time 140 men. Of the 879 who have studied in the college for longer or shorter periods, 361 have completed the prescribed course of study and received the degree of Bachelor of Science.

Complete statistics of 313 of these men, the graduates of the last class not included, are at hand, and examination reveals the following facts: One hundred and sixty-two of these men, rather more than one-half of the entire number, are either farmers or engaged in

closely allied pursuits. There are 92 farmers, and the remainder are distributed as follows: Agricultural editors, 4; fertilizer business, 7; teachers in agricultural institutions, 20; experiment station directors, 2; veterinary doctors, 7; professors of veterinary science, 2; assistants in experiment stations, 22; assistants in the Board of Agriculture, 2; Gypsy Moth Commission, 4.

I want particularly to call attention to the prominent positions occupied by our graduates in agricultural colleges and experiment stations throughout the country. No other agricultural college has furnished so many men for such positions. One-sixth of all our graduates are employed in agricultural colleges and experiment stations. Among our graduates, we find two college presidents, several professors of agriculture, two directors of experiment stations, and several vice-directors. Among thase men not connected with agricultural pursuits we find nine lawyers, eighteen engineers and eleven teachers. Medicine claims no less than eighteen men, and there are two dentists and four clergymen. These men, occupying the prominent positions they do, educated in sympathy with agriculture and understanding its needs as they should, must exercise a powerful influence in its favor. Many of them will doubtless some day own and manage farms.

Business claims the greatest number among those of our graduates who are not farmers, and no one who remembers the splendid opportunities for the acquirement of wealth in business pursuits will wonder that this should be the case.

Our graduates touch agriculture, however, at other points. Indeed, wherever they are found they are usually prominent in every movement which tends to uplift the agricultural classes. Thus we find among them numerous presidents and secretaries of our agricultural societies, and members of the State Board of Agriculture. Two of them have been masters of the State grange, two of them have been lecturers of the State grange, and they are everywhere at the head of local granges, farmers' clubs, etc.

It may be thought by some of my hearers that in not having graduated a larger proportion of men who have become farmers the college has in a measure failed to accomplish the object for which it was established. Let me ask your attention to the words of its first president, taken from a report published in 1867:

"The fear is expressed by some that, if an attempt is made to give a truly liberal education, the students will turn aside from agriculture to other pursuits. Undoubtedly some of them will. If such an education is given in practical science as ought to be given in such an institution, there will be a demand for its students as teachers and in other professions. And it would be an education entirely unworthy of Massachusetts, and contrary to the plain intent of the Act of Congress donating the land, if it were so meagre in its requirements that the students should be fitted only for one pursuit in life. No surer way could be devised to defeat the very end for which the college was established than to conduct it on a plan which proclaimed in theory and practice that its students were to be kept in ignorance of certain things lest they should be above their calling. No institution can ever succeed on such a plan, and it ought not. It is difficult to see what a student would enter such an institution for. Such views are repugnant to every generous feeling which an educated man ought to possess, contrary to the principles of our institutions, and are not sustained by the present position of the agriculturists of this State. The adoption of such a system would be simply saying to the farmers of Massachusetts that they are tillers of the soil because thay are too ignorant for other pursuits. An entirely different principle has been acted upon in organizing the college."

You will see from this that it was not expected that we should educate only farmers, nor was that considered desirable. It was believed that these men, educated in the agricultural college and going into other pursuits, would possess and act upon the dictates of a more enlightened judgment in all matters pertaining to the agriculture of the country and thus indirectly promote its progress—nor, I may add, has this expectation been disappointed.

I trust that I shall be acquitted of egotism in thus calling attention to the agricultural college of Massachusetts. In what I have said my object has been simply to give you a knowledge of the results in what is the most purely agricultural college in the country.

One or two other phases of our work must be briefly alluded to. In 1893, we offered for the first time a two years course in agriculture. The numbers presenting themselves for this course have been fair. The students have shown a very gratifying interest in their work, and I believe such a course will be useful. The age limit is fifteen years and the examinations for admission to it are less difficult than for the longer course. An effort is made to suit this course to the requirements of young men unable to spend the time necessary for the longer course or to meet its expenses, who purpose to become farmers or gardeners. There is, however, a strong feeling that this shorter course was injuring, or would injure, the longer, and as the latter is considered the more important as making more for progress, the two-years course will not be offered hereafter. In place of it we shall offer short winter courses such as those of which I have already spoken. We now offer also post-graduate courses leading to the degree of M.S., but in this direction our work has as yet been limited.

THE OLD AND THE NEW AGRICULTURE.

Mr. C. C. JAMES, Deputy Minister of Agriculture, was introduced, and said: It is not many years ago since the farmers of this country lived in log houses that were heated by large open fire places and lighted by tallow candles; when the farmers, with their families, were dressed in home-spun and supplied with food such as they produced entirely on their own farms; when they had but few recreations, such as an occasional visit to some neighbors. When they attended church it was in their own home, or they went to some neighbor's house, where the minister came from time to time, to listen to his instructions. When the week was done they rested with an honest feeling of having done their duty. It was a time when they had few evenings to spare and they spent them alone, isolated and shut up to themselves. That is a period not very long ago.

Now, all through this country, we find farmers living in stone, or brick, or frame houses, heated by coal stoves, and in some cases by furnaces; supplies of all kinds are brought by light vehicles almost to their very doors; daily papers, agricultural weeklies and magazines, Government reports and bulletins containing reports of Farmers' Institutes and other agricultural meetings are distributed broadcast, and in all directions the farmers to-day enjoy advantages which bring out their latent power in a manner that was utterly impossible under the old system.

There are many here to-night who can go back in memory to the old condition. You are now living in the new. What has brought about this great change? I shall not go into it in detail, but will refer briefly to four things:

First, there has been developed all over the world a wonderful system of transportation. Steam to-day drives great steamships over the ocean, so that, where it formerly took weeks to go from one point of the world to another, it now takes only days. Our continents are crossed by many lines of railways, and the products of Australia are sent to Europe to compete with those of America. There has been a widening out of communication, and at the same time all parts of the world are being brought closer together. The result of it is that we are compelled to raise our farm revenues from the production of the higher grades of articles, using as food for our animals the coarser grades which were formerly sold. In the old days the farmer had the various contributions from his swamp lot or wood lot, and, from his cultivated land his wheat and other grain. What has he to-day? He has the sheep, pigs and cattle, the beef, and mutton, and pork; he has his wool, and butter, and cheese; he has his fruit and a number of other articles. So that you see, not only in the mode of life, but in the methods of agriculture, a change has come to you, and one way that has been brought about is through improved transportation facilities.

The second change I will mention has been brought about by the application of machinery to agriculture. It is about thirty years since the first reaper was used in American agriculture. Now, just think of it! For thousands of year and until fifty years ago, the sickle was the sole implement used for reaping the grain. Then we had the

scythe introduced, and next the cradle. Now we have the self-binder. What next? That is one illustration to show that in the last half century we have made more progress in this direction than had been made in the whole previous history of the world. Perhaps in no branch of agriculture has the application of improved machinery been more noticeable than in connection with the dairy industry. We have now our milking machines, our machines for churning the butter and working it and salting it. The fact of the matter is, it is possible from the very drawing of the milk to the factory to the placing of the finished product on the market, to go through all the operations by machinery.

Another thing that has wrought so much change upon agriculture is that which we have been hearing so much about during the last two days—the application of agricultural science. It is a thing of modern development. I believe that agriculture is to day going through a more complete and more rapid change than that which is experienced in towns and cities, owing to the results of scientific development.

The fourth cause is the dissimination of information. The education of agriculturists in their own calling never received so much attention as it does to day. We have it on all hands. We have it in the press. Take up our daily papers and you find increasing space being given to the more important facts in connection with agriculture. The same thing is found in the most cultured magazines of our country. The press is disseminating this information. Reports are published of public meetings of farmers of all kinds. The result is that where formerly information was confined to a few it is now going to all our people.

All these together are bringing about what we may call a revolution in connection with agriculture. What lessons can we draw from them? The first is simply this: It will not pay any dairyman to stand by and close his eyes to the state of affairs. We must recognize the fact that the condition of agriculture to-day is different from what it was fifty years ago, twenty-five years ago, or even ten years ago. Agriculture is developing, and, if we are going to keep up with it, we must recognize, first of all, that a great revolution is now in progress. The next ten years will show a greater development than the past ten years have done, and if you stand still you will be in the same position in a very few years that your fathers forty years ago were as compared with the agriculturist of to-day.

The second is that we ought to get right into harmony with this new development; we ought to place ourselves in alliance with it, so to speak. How can we do that? By associating ourselves with such organizations as we have here; by getting right into the current and taking advantage of it for improving ourselves in connection with this work. There are a hundred and one opportunities. Where our fathers had one advantage of this kind we have now twenty or more, and because of the many advantages we have, we are apt to overlook many of them.

The next point I want to bring out is one which will appeal to the townspeople as much as the country people. The new agriculture has brought our towns and cities and the country much closer together. There was a time, twenty-five or thirty years ago, when the farmers lived to themselves. They did not need to come to our towns and cities. The farmer produced everything that was necessary to sustenance, coming to the town, perhaps, when he was in need of tools, and taking care to go to the manufacturer for them. Not so now. He goes to the town or city, and, instead of going to the great manufacturing establishment, he goes to the dealer for articles probably made in these great manufacturing establishments; and week after week the butcher and baker drive out through the country. The fact is that the country is depending upon the town for a large part of its requirements, but perhaps more so is it the case that the town is depending upon the country for its requirements. There should be a heartier co-operation between the people of the city and town and the people of the country. We are here asking, what can we do to build up this business? Townspeople ask what they can do to induce some industry to locate in their midst, and sometimes after an industry has been secured, some other place will offer a bonus and it will move on. In many cases of course these things are more permanent. Yet all the time there has been lying around,

adjacent and tributary, an undeveloped industry, which after all is the most important factor in connection with the town or city. I think there ought to be more co-operation between the country and the towns and cities. The one cannot live without the other, and if the towns would turn their attention a little more to assisting the farmers, they would probably bring more business to themselves than in any other way they have ever tried. Now, for instance, the dairy industry around this Town of Cornwall is not what you would like it to be. Let me give you one illustration. In the adjacent counties of Leeds and Grenville the cheese factories alone bring to the farmers of those two counties over one million dollars a year; even in periods of depression I think it amounts to $1,250,000. I do not think there is any industry at all to be compared with that so far as the effect is concerned upon the prosperity of the towns and villages in those counties. Are you going to stand idly by and say, dairying is a fine thing; it has done magnificently for some counties; it has built up some counties of the west, such as Oxford and Perth? Why do not the farmers of this county take hold of this thing and build it up—as it should be developed? I do not know that it ought to depend on the farmers altogether. I say the initiation might proceed right from this very place, where there are men of intelligence and men of means.

Something was said about the great benefits of uniting the people of this country. I think what I have said just now is exactly along that line. You will find, with the farmers and people of the towns and cities joined together to develop our industries, that thereby unity of one section with another will gradually spread from one end of the country to the other, until we have a country, not divided into factions and fractions, but united and prosperous.

There is another thing. In these days when one hears so much about wars and rumors of wars, you never hear anything of that kind proceeding first from the rural classes, because you have, in agriculture, interests which anchor down the population to the land; but it is where you have a large floating population blown about by any little wind, that trouble always begins. It is exceedingly important that we anchor down to the land carefully, firmly and well, the farmers of this country, and there is no way that can be done so well as by making them take an increased interest in their work.

You show to-night by your presence here that you are entirely in sympathy with this work. It is possible this Association may never come back to Cornwall, and probably not for a long time, and I say that the people of Cornwall and vicinity have during this convention one of the opportunities that come but seldom to a people. The effects of such meetings, financially, mentally and morally, cannot be measured simply by the time they take or by the people who come out to them. I have no doubt if we came back here next year, this hall would be crowded, and why is it not crowded? A man told me the other day that he believed one reason why these meetings were not better attended was that too much was being done for the farmers; that if less were given to them probably they would appreciate what they got a great deal more. Now, to you this Association extend their very best wishes for your future progress, and hope that this meeting may be the beginning of an increased interest in your work; that you will take a new start from it; and if ever the Association comes back to see you again I hope that by your general prosperity it will be noticeable that good has been done by the holding of the convention of this Association here upon this occasion. (Applause.)

THE CULTURE OF HOUSE PLANTS.

Mr. JAMES FLETCHER, Dominion Entomologist, Ottawa, then delivered an interesting address on the culture of house plants. He spoke on the same subject at the Eastern Dairymen's convention and his address on that occasion is given in the report of the Eastern convention. (See page 20.)

Cordial votes of thanks were tendered to the Chairman, the speakers of the evening and the Knox Church Quartette, the audience united in singing the National Anthem, and the convention adjourned at 11.30, to meet again on the following morning.

THIRD DAY—MORNING SESSION.

The convention resumed at 9.30.

AUDITOR'S REPORT.

Mr. R. G. MURPHY presented the Auditor's Report for the year 1895, as follows :

(See appendix, page 272.)

The report was adopted on motion of Mr. R. G. MURPHY, seconded by Mr. J. VANCE.

MR. BRONSON'S FARM.

Mr. JOHN SPRAGUE, Ameliasburg, said : "I wish to return thanks for being driven around the town and up to the farm of Mr. Bronson. I would remark here that I found the stables of Mr. Bronson in nice condition, and I had some conversation with him in regard to the cultivation of silo corn. He uses what he calls a 'weeder,' which pulverizes the top of the ground thoroughly. It is a question whether we should cultivate any deeper than the top. He had a great supply of corn. It was planted on the 8th of June and cut on the 15th September, when, he says, it was mature. I have had no such experience as that."

Mr. YOUNG : What is the variety ?

Mr. SPRAGUE : The corn is the Early Mastodon. I have found no corn that would mature under 130 days.

INSTRUCTOR'S REPORT.

Mr. MARK SPRAGUE, was then called upon to read his annual report, which is as follows :

It is with pleasure I present to you my report for the year just ended. We commenced visiting creameries on 28th March, giving attention to those just starting, or new creameries. Of these there were nineteen, eighteen separator, and one cream gathering. This occupied my time fully to June 3rd., after which I travelled from one to the other in the regular way of instruction and milk testing up to the first week in December.

There were numerous calls throughout the season from creameries that unfortunately had met with some mishap to the machinery. All of these were given prompt attention, and with as much haste as the railroads and the bicycle rendered possible.

There is one very satisfactory advancement which I am pleased to report, and that is the large percentage of creameries that are paying for milk according to the butter-fat value. With the closing of the season there were only nine creameries pooling their milk. My argument and aim, when visiting the various creameries, have been directed toward

introducing this system, believing the benefit to be two-fold: First, the patron gets just and proper reward for his milk. On the other hand, the patron's interest in his milk to be paid for by the fat value is increased, and he is stimulated to give the milk his very best attention that it may be in a condition on its arrival at the creamery to afford a reliable sample, so that the test recorded may show as large a per cent. as possible. While the patron is doing this, he must send a better milk to the creamery.

The change in the system of paying for milk according to the butter-fat value, from pooling it, in most localities is very difficult to introduce successfully, but I think the benefits therefrom will well repay any creamery man. Many instances can be pointed out where the average per cent. of fat of the total milk received at creameries has surprisingly increased after adopting the system. Wherever the paying for milk according to the butter-fat value has been introduced, the demand for the instructor to test the milk to detect adulteration, if there previously was any, will cease.

The patrons, as a rule, look on the Babcock test suspiciously, not so much with reference to the test as with reference to the ability of the operator. They believe it to be much more intricate than is really the case. What my suggestion would be in these cases, is to make the patrons familiar with the operating of the Babcock test by calling them together from time to time and educating them to handle the test for themselves, bringing samples of milk from their individual cows, thereby disabusing their minds of the idea that the Babcock test is difficult to operate, and securing their implicit confidence by giving them more light.

I am more and more convinced that the brightest days for the Ontario Creameries' Association are just dawning, and the ten years of its life have been only preparatory, so to speak, and those who have been so untiring and devoted to its work will be amply repaid just to see and know of the great progress that will be made in the ten years to come. The butter-makers' ideas and education are being put upon a systematic basis throughout our Province, that all our butter may be uniform in quality and color. The different colors, degree of salting, style of package, etc., required by different markets are now carefully studied, and confidence in Canadian butter is growing.

The salesmen and dealers have learned also that this superior and delicate butter needs to be put on the market while fresh and new, or a suitable place must be provided to keep it at a low temperature until it is put into consumption. This is not all. The Dominion Dairy Commissioner is bending his energies to assist the Creameries' Association and the buttermen and farmers engaged in this great industry by endeavoring to bring the British markets right to our door; and it is pleasing to all to know that his efforts are being crowned with success. And may the Creameries' Association be still more diligent and determined in the good work, and our Dairy Commissioner be spared to enjoy the great satisfaction of knowing that our labors are not in vain, and that the benefits derived therefrom are equally enjoyed by and widely distributed among our fellows.

Not wishing to take too much valuable time, I will conclude by thanking the Creameries' Association and creamery men of Ontario for courtesies extended me in the performance of my duties, and should I be again entrusted with the instructorship, I will try and be worthy of your confidence.

The PRESIDENT: We have listened with a good deal of pleasure to the Instructor's report, and I may say that we have had the greatest satisfaction from having a competent man in charge of our creameries—a man who has been devoted to the work, and who has given the best of service to the Association and all its members. From all parts of Ontario come the same report, that he is a most painstaking, diligent and competent man.

Mr. J. S. PEARCE moved, seconded by Mr. R. G. MURPHY, the adoption of the report, which was carried.

BUTTER-MAKING EXPERIMENTS.

Mr. H. H. DEAN, Professor of Dairying at the Ontario Agricultural College, Guelph, was introduced, and said: I regret exceedingly that my work at the College prevented me from coming here before to-day. I could not do so because the Dairy School opened yesterday. I understand that you have already been talked to so much that you are barely alive, and I shall not inflict a long address upon you this morning, but will merely give you an outline of some things I had intended saying in connection with some experimental work in butter-making at the Agricultural College.

The first thing I wish to do is to give you the results of the testing of our dairy cows. I find that as a result of testing this past season the best cow we had in our dairy —and we had about twenty-five—gave us 10,090 lbs. of milk, containing a little over 370 lbs. of butter fat, which is equal to over 400 lbs. of butter. In our calculations of butter from fat we add ten per cent. to the butter-fat, so that this cow has given us over 400 lbs. of butter. The poorest cow was one that gave 3,776 lbs. of milk, containing 130 lbs. of fat, which is equal to about 140 lbs. of butter. Now, notice the difference between the 400 lb. cow and the 140 lb. cow. The latter we sold to the butcher. My judgment is that he who is improving his dairy herd will always have some cows to sell to the butcher, and if he does not do so he is not making the best out of his dairy. He must be continually weeding out the poor cows as they deteriorate in milk yield. The only way to know a real good cow is to weigh her milk and test its quality by the Babcock tester. I have been preaching this for the last four or five years, and I feel the subject is so important that I would lay stress upon it this morning. Now, if you come up to our dairy you will see on cards tacked up at the head of the cows showing their names, the quantity of milk they have given, the number of days they have milked in a season, the number of pounds of butter they have given during the season; and I think if every dairyman would do that we would not have so many cows, but their quality would be very much improved. We have cows all the way between the 400 lbs. and the 140 lbs. I have mentioned. We have quite a number giving 6,000, 7,000 and 8,000 lbs. of milk. I repeat that no cow should be kept which does not give at least 6,000 lbs. of milk or make 250 lbs. of butter in a year. We have sold cows this year because they do not come up to the point required. Some people think that because they have some cows that give very rich milk they are the most valuable cows. It does not always follow that such are the best cows. For instance, one cow we had this past season has been testing as high as six per cent. of butter-fat. That was not, however, the best cow we had in our dairy by any means. There are three things that govern the value of a cow, the quantity and quality of her milk and the cost of the food she consumes. I can tell you the first two qualities of our herd, but I cannot tell you the third, for the past year. This present year we are weighing the food of each cow, and at the end of December, 1896, I hope to tell you just what the food has cost for each cow. Then, whenever we have got that with the other two I can tell you the relative value of each cow in the herd.

There is just one other topic that, perhaps, you have discussed already. Some say that if you feed the cows on rich food you will make their milk richer than it would be otherwise. All our cows get the same food, but in different quantities if they can eat it; yet we find there are just as many differences in the percentage of butter-fat as we have cows, or, in other words, no two cows give exactly the same quality of milk. Owing to this fact, and for other reasons, I conclude that the food has little effect on the percentage of fat in milk. The only case I ever heard of where the feed affected the character of the product was in that of a Texas man who was in the habit of giving his cow a bran mash, but one night he gave her a mash of sawdust, and on account of the hard times she thought she had to eat it. Next morning when milked she gave instead of milk a quart of shoe-pegs, a gallon of turpentine, and a bundle of lath. (Laughter.) That experiment cannot be repeated.

The next thing is with reference to tests in the creaming of milk. For three years we have been making experiments with deep and shallow setting and with the

separator. The separator has always given us the best results, so far as the loss of fat in the skimmed milk goes. The pounds of milk required to make a pound of butter this past year were: From the shallow pan, 25.05; from the deep setting, 24.47; from the separator, 23.91, all under the best conditions. Now, not only did we get the best results, so far as the loss of fat in the skimmed milk goes, but taking the average quality of the butter it has been slightly better from the separator. Sometimes the butter made from the shallow pan would be ahead of that from the deep, and some times the deep setting would be the best, but on the average that from the separator was the best. How was that? In hot weather we found it hard to make good butter from cream raised with the shallow pans. In cool weather we can make just as fine butter from the shallow pans as from any system, but when the weather gets hot they are "not in it." Sometimes the butter was extra in quality from the shallow pans when the cream had been kept cool.

The average time required to churn the separator cream was twenty-seven and a half minutes; from the other methods, thirty-two minutes. From my trip to Denmark, and what I observed there, I am inclined to think that one of the reasons why Danish butter holds the high price and position in the market that it does is from their almost universal use of the cream separator. I have nothing to say against cream gathering creameries. They are suited for some sections, but I hope to see us adopt the separator system entirely some day. At a former meeting I discussed these two methods of conducting creameries, but, as I have said, I believe the preference which the Danish butter enjoys comes from the large use of the separator in its manufacture. Why? Because the maker has control of the cream from the time it comes from the milk, and I think he can make a larger average of good butter in a year than when the farmers skim the milk at home.

Now, a word as to one or two conditions in connection with the use of the cream separator. We have been creaming milk at different temperatures to see which was the best temperature. We made twenty-eight experiments from April to October. When the average temperature was 82.2 degrees the loss of fat in the milk was .09, and the per cent. of fat in the cream 26.44. We increased the temperature until the average was 118 degrees, and the per cent. of fat was slightly less in the skim-milk (.06) and slightly more in the cream (30.9). The higher the temperature of the milk, the higher was the percentage of fat in the cream, other conditions being equal and the speed and feed of the separator being constant. It is just a question whether it would pay us to heat to 100 degrees or over except in winter, because it means expense to heat the milk and to cool the cream, but with some kinds of machines I believe it would pay before separating to heat it higher than eighty-five degrees, which is the common temperature.

Another point we have been experimenting upon this year was to see the loss of fat in skimmed milk from milk having different percentages of fat. We took milk in which the average percentage of fat was 4.18. When the whole milk tested 4.18 per cent., there was .08 per cent. of fat in the skimmed milk and 26 47 per cent. in the cream. When the whole milk averaged 3.30 per cent. of fat, there was .09 in the skimmed milk and 21.64 per cent. in the cream. The volume of cream obtained was about the same whether rich or poor milk was separated. One hundred pounds of 4.18 milk gave 15.1 lbs. of cream, and the same quantity of 3.30 per cent milk 14.7 lbs. of cream. But the per cent. of fat in the cream was greater from the rich milk. The volume of cream obtained from a vat of milk is governed largely by the speed and feed of the machine or the way it is set, and does not depend very much upon the per cent. of fat in the whole milk, but the richer the whole milk the richer will be the percentage of fat in the cream. That is a point which we want to improve upon, *i.e.*, to get richer cream in order to get the best results of churning. The best results are obtained in our experience from cream having twenty-five to thirty per cent. of fat.

For three years we have been experimenting on the effect of churning sweet cream. Three years ago there was talk by advocates of the butter extractor to the effect that butter made from sweet cream had a chance of two markets—you had a chance of the

market for butter made from sweet cream and if not sold you might allow this butter to ripen and sell it as ripened cream butter. Our experiments prove that this is not the case. The butter from sweet cream when first made has a nice, sweet flavor, but at the end of ten or twelve days it goes off flavor and at the end of three weeks is rancid. So it lacks keeping quality, and you do not have a chance of two markets. Samples of sweet cream butter that we sent to some of our customers were liked very much, indeed. I believe if we could get it on the English market two or three days after churning it would be all right, but that is not possible. We have to suit the taste of our customers. An average temperature of forty-five degrees or below is necessary to get the best results in churning sweet cream, and from an hour to an hour and a half is needed for churning. This plan gives better butter and occasions the least loss of butter in the butter-milk.

We have been making some experiments this past year on the effect of starters and ripening cream, and perhaps that question has been discussed more than any other in connection with butter-making. We have heard a good deal about Conn's bacteria No. 41. At first they sent it out in a sort of a semi-solid condition, and we found that what we got in that shape was more or less mouldy though the results were very good. This (producing sample) is the first we have got in the powdered form. They claim it will give better results. You will notice the Wisconsin Dairy Station has taken up this matter, and given an unfavorable report on this starter. They say it contains a very small percentage of the B. 41. The results of these experiments can doubtless be obtained in reports by writing there. If anything like that comes out and is boomed, I think the experimental stations should take it up and see whether there is anything in it. If it is something good the people should know it. If worthless, they ought also to know it. The results of our experiments are as follows: The first tube we got gave a decided flavor to the butter, different from anything we had hitherto had in connection with our work, but we found this flavor disappear very quickly. At the end of a week it was all or nearly all gone. Now, on one occasion, about a month after we got the first tube, a starter prepared in the ordinary way from milk gave the very same flavor. I can not account for that unless some of the bacteria from the tube got into the milk. Now, this is one of the things we have only started in upon. You will pardon me if I refer again to the work of Denmark in this connection. I was surprised at the number of creameries there pasteurizing their cream and using these starters, and the number doing this is increasing. They are giving satisfaction. All the pasteurizing apparatus I have seen in this country seems to be so clumsy that I do not know whether they shall ever come into general use or not. By pasteurizing we mean heating the milk to about 160° so as to kill germs. The milk or cream is afterwards cooled. After standing five hours they put in these cultures. The maker has always two sets of cultures on hand in case that one fails or goes wrong. If one had a bad flavor he would not use it, but would use the other. The bad flavored one would spoil his butter. He overcomes the risk of spoiling his cream by having two. We have done practically nothing in this country in this direction, and it is one we must do something in if we want to ensure the flavor. I recommend the following method of preparing a starter: Take some fresh-skimmed milk from a cow that has been milking a short time, heat to 171°, let stand twenty minutes, cool to eighty-five degrees and get a starter of good flavor and propogate that from day to day so long as it retains good flavor. I think that is the best plan of getting a starter.

Now, about washing the butter. We have made a number of experiments during the past year on the effects of washing butter. Why do we wash butter? I think we have been making a mistake by washing too much. In Denmark they do not wash their butter at all. When it gets to be about the size of grains of wheat they add a small percentage of water then churn it a little longer and dip the butter out of the buttermilk with a hair sieve. The milk is then pumped up into a tank. That is all the washing the butter receives. Why do we do it then? Well, we have been told that unless we wash butter it will not keep. If we make it to eat at once and not to keep I would say wash very little or not at all. That is one reason why the Danish butter is not washed. It is not spoiled before reaching the British market.

How about keeping it? We have found very little difference in the keeping quality of that butter as compared with butter made in the ordinary way, and I am just a little doubtful at the present time whether washing does affect the keeping quality to any large extent. I hope after some more experiments to have that point settled.

A few days ago I went into a commission house in Toronto, and the merchant said one of our students is sending butter to him which is not right. On looking at it, I found it was crumbly or short in the grain. I said to him that the student was washing with too cold water. I believe that is the result always, especially in the winter time. There is no need of washing with such cold water as is commonly used.

Now a word as to the working of butter. Should butter be worked once or twice? I was surprised to find that the Danish method is to work it twice, and, in many instance three times. They gave this as the reason: They said there was a complaint that Danish butter had too much water in it; the English people have found out that a shilling a pound for water was too high. They found as high as twenty-one per cent. of water in some butter at Copenhagen, and owing to this complaint they are working the butter once and twice and even three times, and the average percentage of water is now down to fourteen and a half per cent. There is strong talk in England of having butter containing more than sixteen per cent. branded as adulterated.

Now, as to salting butter. Canadian butter has nearly all too much salt in it for the finest English trade. From three to five per cent. of salt is about right for English taste. We have been putting in ten per cent Half an ounce to the pound is enough.

As to the packages, we have not studied this question of package and must get same kind of a package that will not give the butter a woody flavor. I do not think that lining the package with parchment paper will prevent this. In one or two experiments where packages were lined with paraffine wax the results seemed to justify the conclusion that we have solved the difficulty to a large extent. We are going to make the experiment of sending twenty boxes to the English market and having them lined with paraffine wax this present winter. I think paraffine wax will prevent the woody flavor, because in a package lined with it, which we kept for a month we found no such flavor, and no leakage. Another point is to get the butter packed solidly in boxes. Mr. Davidson, of Glasgow, said to me that the Australian butter was in his opinion put into the boxes under pressure. I would like to see some contrivance used for this purpose similar to the cheese press. British buyers like, when they turn out the butter, to have it just like a block of marble. If there are any holes in the butter the butter-milk collects in them which gives a bad appearance to the butter. I hope during the coming year to make some experiments along that line. (Applause.)

MR. MURPHY: Don't you think that short-grained butter could be produced by the milk being chilled before it is put through the separator?

PROF. DEAN: I never thought of that. It might be, but I think it is largely caused by washing it with cold water.

MR. D. J. MCLENNAN: What breed is the cow which gave 10,000 lbs of milk?

PROF. DEAN: Holstein.

MR. MCLENNAN: What was the feed? Did you feed her bran the whole summer season.

PROF. DEAN: Not at all. Perhaps with the exception of a month or six weeks, we did not give her any bran in the summer.

MR. CROIL: How much water is allowed in butter in England?

PROF. DEAN: All having over sixteen per cent. is objected to to-day. They are talking of branding all having over sixteen per cent. as adulterated.

MR. MCLENNAN: Has salt anything to do with keeping qualities?

PROF. DEAN: I think it has.

MR. MCLENNAN: Would the amount of salt you put in have anything to do with it. Suppose we put in more than half an ounce what would be the effect on the keeping quality?

PROF. DEAN: We have made no exact experiments yet on the point raised.

THANKS TO THE TOWNSPEOPLE AND PRESS.

Moved by R. G. MURPHY, seconded by R. J. GRAHAM, That the thanks of this Association be tendered the citizens of Cornwall for their generous reception; to the railways for reduced fares; and the press for full reports of our proceedings. Carried.

CLOSING PROCEEDINGS.

PROF. BARRÉ, of Winnipeg, followed with a few remarks in support of Prof. Dean's statements about butter-making.

MR. JOHN H. CROIL, of Aultsville, spoke in favor of sweet cream butter.

Mr. THOS. J. DILLON, Superintendent of Dairying for P. E. Island, on being asked by the President to address the meeting said: It would be unfair to the audience for me to attempt to address them without some preparation. I would just say, however, that I would like to see a better package for shipping butter than any we have at the present time. Whitney Bros., of Woodstock, Ontario, are getting up a very nice package, but it is too expensive for shipping long distances. I think if some of those interested in the trade would set their minds to work they could devise a more suitable package for shipping to warm climates. With regard to creamery plant, if the cream vats were put on wheels similar to those on trucks, used for handling baggage and express at shipping places, they would be much more convenient. The wheels would need to have a broad face of seven or eight inches so they would not cut the floor. They could then be run up to the churn, which should have a trunk cover. A tin bridge extending over the edge of the churn and end of cream vat could be used, and the cream dipped with a flat-sided pail into the churn, which is the quickest and most economical way of doing it. This would do away with the perfection gates that are generally used on cream vats, and which add considerably to their cost. There will be no leaks round the gate, and when the lower part of the vat requires cleaning it will be more apt to be done as the pan can be lifted out with very little trouble. In my experience with churns, I have found the trunk covers to give the best satisfaction. These churns are easier made tight, and are much more convenient for taking the butter out of. Where separators are used in a factory already equipped for cheese making, it would be a great convenience to have them eight or ten inches lower than those that are being made now. If they were lower a small feeding vat holding, say, 400 lbs. of milk, could be placed across the cheese vat in which the milk is received and heated. The milk could then be dipped, or otherwise elevated, into it, and let run direct to the separator.

The PRESIDENT, in bringing the convention to a close, said he regretted that the farmers of the surrounding townships had not turned out in larger numbers to hear the splendid addresses delivered by the leading men of the dairy industry on this continent. He would like to see the people of the town and country mingle more together. The Association has been invited to hold their next convention in London, Hamilton, Fergus and other places, but this was a matter which would be decided later on. It had been intended to hold an afternoon session, but judging by the attendance the people had had enough of it, and they would now adjourn. Before bringing the meeting to a close he desired to express his regret that the recent stirring events at the capital had prevented Dr. Bergin, M.P., and Major McLennan, M.P., from attending the convention.

The convention then adjourned.

APPENDIX.

LISTS OF MEMBERS

1896

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

Name.	P. O. Address.
Allen, H. M	Port Hope.
Ashley, H	Belleville.
Andress, J. P	Peterboro'.
Anderson, James C	Norham.
Bird, Morden	Stirling.
Brenton, F. W	Belleville.
Brentnall, E. P	Belleville.
Buchanan, Robert	Westmeath.
Blezard, Thos. M.P.P	Westwood.
Bensley, W. W	Warkworth.
Bensley, G. H	Warkworth.
Burgess, D	Havelock.
Bensley, George	Warkworth.
Black, D	Campbellford.
Blute, Thomas	Campbellford.
Bensley, H	Warkworth.
Carlaw, T. B	Warkworth.
Craig, R. A	North Gower.
Craighead, James	Campbellford.
Clarke, W	Meyersburg.
Cleugh, James	Sarginson.
Carlow, D	Warkworth.
Crediman, Geo	Norham.
Clark, G. M	Warkworth.
Cook, George	Trent Bridge.
Carlaw, H. J	Warkworth.
Cock, William	Campbellford.
Clark, John	Box 250 Campbellford
Dargavel, Jno. R	Elgin.
Derbyshire, D	Brockville.
Darling, D	Morganston.
Diamond, E	Campbellford.
Dilworth, Thomas	Meyersburg.
Donald, Peter	Campbellford.
Douglas, Jno. H	Warkworth.
Drury, W	Warkworth.
Dickson Brothers	Campbellford.
Eager, George	Kemptville.
Eager, William	Morrisburg.
Ewing, J. B	Dartford.
Ewing, Peter	Warkworth.
Elliott, W. G	Thomasburg.
Free, Abraham	Campbellford.
Fairman, John W	Godolphin.
Ferris, J	Campbellford.
Free, H. R	Cold Springs.
Fowlds, James	Campbellford.
Fowlds, H. W	Hastings.
Fraser, Hugh	Havelock.
Frederick, R. M	Campbellford.
Goodman, Joe	Toronto.
Gillespie, C. S	Campbellford.
Gallagher, P	Warkworth.
Givan, John	Campbellford.
Graham, G. A	Westwood.
Gibson, James	Campbellford.
Hallowell, Jno. E	Stirling.
Hoard, B. E	Campbellford.
Howard, Theodore E	Toronto.
Hart, R. H	Belleville.
Hay, G. A	Campbellford.
Harrison, G. H	Crookston.
Henderson, Ernest G	Windsor.
Hubel, Sylvanus	Glenross.
Honey, R	Brickley.
Howey, H	Newburg.
Hoard, Wallace W	Hoards' Station.
Holcomb, Wellington	Havelock.
Hughes, Thomas	Burnbrae.
Hume, Brothers	Campbellford.
Irwin, James	Sarginson.
Jardine, J. W	Bartonville.
Jibb, Joseph	Fenella.
Johnston, William	Havelock.
Johnston, Joseph	Havelock.
Johnston, D	Campbellford.
Kidd, Edward	North Gower.
Kline, F. E	Lakefield.
Kerr, Duncan	Campbellford.
Keville, C. F	Peterboro'.
Kline, E. E	Fraserville.
Kerr, J. A	Ivanhoe.
Kitchen, J	Havelock.
Ketcheson, D. H	Menie.
Kelleher, John	Campbellford.
Lowrie, John	Frankford.
Logan, A. A	Morrisburg.
Lottridge, James M	Hamilton.
Line, McDonald & Co	London.
Labatt, John	Campbellford.
Loutitt, Charles	Campbellford.
Lowrey, J. G. B	Frankford.
Lane, John	Big Springs.
McCargar, J	Belleville.
McTavish, John	Vancamp.
McKay & Co	London.
McComb, S. S	Springbrook.
McCann, J. D	Perth.
McCullough, Geo	Perth.
McRae, J. R	Campbellford.
Meiklejohn, R. W	Sarginson.
Magrath, W. J	Belleville.
Murphy, R. G	Elgin.
Mulloy & Co	Winchester.
Munro, William	St. Elmo.
Mullett, James	Castleton.
Moore, James	Hastings.
Miles, C	Hastings.
Morrison, John	Burnbrae.
Mulhern	Campbellford.
Morton, E. T	Campbellford.
Madden, E. J	Newburg.

LIST OF MEMBERS.—*Continued.*

Name.	P. O. Address.	Name.	P. O. Address.
Mallory, C. A	Warkworth.	Stewart, William, Jr	Menie.
Moore, William	Norham.	Shillinglaw, Jas	Burnbrae.
Maynard	Campbellford.	Smith, Charles	Campbellford.
Paper and Egg Case Co	Campbellford.	Stillman, William	Campbellford.
O'Grath & Co., L	Montreal, Que.	Strachan, James	Menie.
Olmstead, G., & Co	London.	Shannon, James	Campbellford.
Oakley, Daniel	Norwood.	Spaulsburg, Jas. F	Warkworth.
Owens, C. L	Campbellford.	The Rathburn Co	Campbellford.
O'Connell, James	Warkworth.	Taylor, Joseph	Campbellford.
Oliver & Boyce	Warkworth.	The Winslow B. & M. Co	Port Hope.
Potter, A. J	Rossmore.	Thompson, C. W	Cooper.
Peters, Alex	Havelock.	Thompson, Thomas	Madoc.
Purvis, A. P	Maxville.	Tait & Douglas	Campbellford.
Pirie, A	Campbellford.	Vandervoort, S. T	Sidney Crossing.
Phillips, W. H	Frankford.	Valleau, J. W	Campbellford.
Patchet, Charles O	Maynooth.	Waters, James & Bro	Campbellford.
Publow, G. G	Perth.	Wade, Henry	Toronto.
Rutherford, John	Campbellford.	Whitton, James	Wellman's Corners.
Redden, H	Campbellford.	West, E. C	Campbellford.
Raney, Thomas	Campbellford.	Wood, David	Peterboro'.
Richardson, W. H	Madoc.	Ward, R. W	Wallbridge.
Renwick, George	Lang.	Weir, John	Lang.
Runciman, George	Warkworth.	Watson, S	Trent Bridge.
Roberts, Christopher	Burnley.	Walker, Thomas, Jr	Hoards' Station.
Stewart, Jas. K	Sarginson.	Walker, H. J. & Son	Warkworth.
Soper, H. L	South Mountain.	Walker, Thomas, Sr	Menie.
Sarles, Joseph G	Chatterton.	Wilson, Francis	Rockdale.
Spence, S. S	South Dummer.	Wilde, Charles	Havelock.
Shannon, John	Campbellford.	Wood, F. W	Campbellford.
Scott, R	Meyersburg.	Walker & Co., R	Warkworth.
Symmons, Nelson	Meyersburg.	Young, Bayard	Napanee.
Skitch, Edward	Campbellford.		

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

Name.	Address.	Name.	Address.
Adams, C. F	Trowbridge.	Bearss, T. M	Corinth.
Agur, E	Ingersoll.	Bell, A. E	Crown Hill.
Alderson, Thomas	Kintore.	Bell, A. T	Tavistock.
Allen, Edwin S	Box 233, Ingersoll.	Bell, E. J	Blandford Station.
Anderson, A. D	Wyoming.	Bell, J. W	Newmarket.
Anderson, Wm	Hickson.	Biffin, James	Bennington.
Angus, W. D	Newbridge.	Bigham, Joseph	Hickson.
Anstice, Chas	Springford.	Bigham, J. P	Dereham Centre.
Atkinson, W. J	Medina.	Bigham, W. R	Culloden.
Bagnell, A. W	Corinth.	Billings, J. S	North Ridge.
Baird, R	Chesterfield.	Biette, P	Chesley.
Baird, Thos. T	Crystal City, Man.	Blackmore, J. G	Drumbo.
Ballantyne, John	Pine River.	Blayney, John	Lynnville.
Ballantyne, R. M	Stratford.	Bray, Jacob	Listowel.
Ballantyne, T. J	Listowel.	Bonser, J. H	Straffordville.
Ballantyne, T	Stratford.	Boothe, G. E	Ingersoll.
Ballantyne, Jno	Fernhill, Ont.	Bothwell, Alex	Hickson.
Barr, Geo. H	Sebringville.	Bothwell, W. A	Hickson.
Barr, S	Mossley.	Bowie, J. T	Crampton.
Barry, T. D	Putnam.	Boyce, H. F	Ingersoll.
Barr, Wm	Sebringville.	Boyes, Frank	Nilestown.
Baskett, Miss Sarah	Ballymote.	Boyes, Geo. E	Evelyn.
Bates, E	Zenda.	Boyes, Wm	Nilestown.
Baxter, Jno	Brownsville.	Brayley, C. H	Marston.
Bayley, Wm	Bluevale.	Brett, W	Ingersoll.
Beaton, John	Alberton.	Briggs, James	Jonesdale, Wis.

LIST OF MEMBERS.—*Continued.*

Name.	Address.	Name.	Address.
Brodie, Geo	Gladstone.	Everett, Chas	Sebringville.
Brodie, John	Mapleton.	Facey, S. E	Harrietsville.
Brodie, Wm. A	Glanworth.	Farrell, P	Woodstock.
Brown, H	Beaconsfield.	Fax, Arthur	Springford.
Brown, James	Ingersoll.	Ferguson, W. J	Ingersoll.
Brown, S. P	Birnam.	Findlay, J. H	Bright.
Brown, M. R	Appin.	Fisher, J. J	Stratford.
Brown, R. W	Stratford.	Flack, Samuel	Lavender.
Budd, George	Sweaburg.	Ford, E. G	Lynn Valley.
Burgess, R. S	Burgessville.	Fotheringham, J. W	Caledonia.
Burrell, D. H. & Co	Little Falls, N.Y.	Frame, Chas	Avonton.
Butler, Wm	Dereham Centre.	Fraser, John	Ethel.
Caddy, Thomas	Ingersoll.	Fulton, Jno	Freelton.
Calder, A. G	Winthrop.	Galloway, George	Ingersoll.
Campbell, A	Thedford.	Garbutt, Chas	Carlingford.
Campbell, D. P	Thedford.	Gardiner, R. M	Valetta.
Campbell, W. S	Brantford.	Garnham, C. R	Straffordville.
Casey, Wm	Potsdam, N.Y.	Garnham, E. A	Straffordville.
Casswell, J. N	Dutton.	Garnham, S. H	Straffordville.
Chalmers, A	Monkton.	Geary, Jno	London.
Chalmers, D	Poole.	Gibbon, Oliver	Norwich.
Chown, Richard	Holiday.	Gibson, J. S	Rocklyn.
Chown, W. J	Elimville.	Gibson, Thomas	Fordwich.
Clancey, A	Rockwood.	Ginther, Ezra	Winger.
Clark, Alex	Shakespeare.	Gilmour, Jno	Nilestown.
Clarke, James	Vienna.	Goodhand, G. E	Milverton.
Cleland, James	Listowel.	Gracey, A. E	Curries'.
Coleman, James	Staffa.	Grant, Alex. W	Montreal, Que.
Connolly, B. J	Kintore.	Grant, Jno. C	Peterboro'.
Connolly, James	Alsfeldt.	Grant, Samuel	Turin.
Cook, G. J	Ingersoll.	Gray, A. W	Stratford.
Cooper, C. R	Toronto.	Gray, James A	Atwood.
Copeland, H. W	Wyebridge.	Green, P. H	Sheffield.
Copeland, J. W	Eastwood.	Grieves, Jas. S	Wyandotte.
Corless, J. G	Burgessville.	Grieves, Thomas	Wyandotte.
Corrigan, Philip	Arkona.	Griffith, A	Thorndale.
Cosh, Newton	Woodstock.	Hallman, Josiah	Washington.
Coulter, James	Walkerton.	Harcourt, Geo	St. Anns.
Cousins, G	New Hamburg.	Harris, A. M	Lakeview.
Crew, Dexter	Wheatley.	Harris, Emerson	Verschoyle.
Crosby, Jno. T	Marden.	Harris, W. W	Rothsay.
Cuddy, Robt	Woodstock.	Harrison, Herbert	Kincardine.
Cuthbertson, J	Wellburn.	Hart, J. P	Woodstock.
Dalton, W. H	Bryanston.	Hartley, J. D	Brantford.
Dawson, Robt	Walkerton.	Hatch, S. W	Lavender.
Day, H. F	Thamesford.	Hately, Geo	Brantford.
Dempsey, D. A	Stratford.	Hegler, J. C	Ingersoll.
Dennis, Jno	Corinth.	Henderson, E. G	Windsor,
Dent, A. S	Woodstock.	Henderson, Joseph	Vyner.
Dick, Norman	Mabee.	Henderson, J. T	Pine River.
Dickson, Wm	Atwood.	Hill, J. R	Woodstock.
Dillon, T. J	Charlottetown, P.E.I.	Hodson, H. A	Montreal, Que.
Dobbin, R. O	Waterloo.	Holland, B. A	Culloden.
Dobie, R. J	Baden.	Hollis, W. T	Atwood.
Dodds, James	Brigden.	Holmes, Geo	Thamesford.
Downham, Peter	Innerkip.	Holmes, J. L	Newton.
Duckfall, W. C	Glenallen.	Holmes, J. W	Dunnville.
Dunn, Ed. H	Evelyn.	Holmes, Wm	Otterville.
Dunn, J. P	Ingersoll.	Hoover, A. E	Upper.
Dunn, J. S	Woodstock.	Hoover, Ed	Selkirk.
Dunn, Thos	Embro.	House, R. H	Tilsonburg.
Durst, Fred	Canboro'.	Huggins, J. R	Beachville.
Eagle, Harold	Attercliffe Station.	Hunsley, Thomas	Beachville.
Easton, R	Paris.	Hunter, Ed	Woodstock.
Eccles, Jno	Kinkora.	Hunter, Geo. L	Waterford.
Edgar, Wm. A	Culloden.	Hunter, Samuel	Rockton.
Edwards, W. O	Box 483, Ingersoll.	Hurlburt, W	Hawtrey.
Elliott, James	Tilsonburg.	Impett, Thos	London West.
Engrem, E. M	Toronto.	Inman, P	Cottam.

LIST OF MEMBERS.—*Continued.*

Name.	Address.	Name.	Address.
Ireland, Ernest	Bright.	Manning, N	Uttoxeter.
Ireland, James	Beachville.	Mannel, H.	Hollen.
Ireland, Robt	Beachville.	Manser, D. A	Brunner.
Isaac, Jno. R	London.	Marshall, Arch	Puslinch.
Isard, J. S	Paisley.	Marshall, Robt	Lakeside.
Jackson, W	Belmont.	Marshall, J. B	Princeton.
Jackson, Miss Lizzie	Petrolea.	Mason, S. C	Bothwell.
James, Jas. A	Nilestown.	Mayhew, J.	Renforth.
Jenkins, Chas	Thamesford.	Maynard, David	Drumbo.
Jenvey, Geo	Ingersoll.	Medd, W. G	Constance.
Jickling, Thomas	Listowel.	Menzies, Geo.	Molesworth.
Johnston, Ed	Holmesville.	Mercer, George	Thamesford.
Johnston, Robt	Bright.	Messer, Jno	Bluevale.
Karn, J. G	Woodstock.	Millar, J. F	Brantford, box 115.
Karn, James	Embro.	Miller, Anthony	Walmer.
Kenny, Geo	Snelgrove.	Miller, T. B	Kincardine.
Kerr, H. S	Corinth.	Mills, Geo	Thamesford.
Kidd, Martin	Aylmer.	Millson, A. E.	Lakelet.
Kitchen, Wm	Gobles.	Millson, Frank	Winthrop.
Knechtel, Moses	Tavistock.	Milne, R. R	Burgoyne.
Lackie, David	Lavender.	Miners, C. G	Tilsonburg.
Laird, S. W	Stratford.	Mitchell, Geo	Salford.
Lane, J. A	Wilcox.	Mitchell, J. W.	Dairy School, Guelph.
Laughlin, W. C	Dorchester.	Moffat, James	Carmunnock.
Leach, C. G	Eden.	Monk, Jno. A	Woodstock.
Leach, D. M	Eden.	Montgomery, James	Innerkip.
Leach, Samuel	Carlow.	Morris, Wm	Avon.
Leach, Z. A	Lucknow.	Morrison, Agnes	Newry.
Leak, F. A	Blytheswood.	Morrison, James	Henfryn.
Lee, S. R	Molesworth.	Morrison, Mary	Newry.
Leitch, A. W	Trowbridge.	Muir, J. B	Avonbank.
Lipsit, J. B	Straffordville.	Munn, Daniel	Windham Centre.
Lipsit, Louis	Straffordville.	Nancekivell, Robt	Ingersoll.
Lorch, A. C	Elmira.	Neill, Jno.	Woodstock.
Luton, C. O	Lyons.	Neville, Wm. H.	Cottam.
McAlpine, Jno	Culloden.	Newcombe, N	Britton.
McCallum, Alex.	London.	Nicholls, E	Bergessville.
McCombs, J. A	Cathcart.	Nimmo, Ernest	Box 107, Ripley.
McCrimmon, S	Otterville.	Nimmo, Thos	Ripley.
McCrow, Robt	Princeton.	Noah, W.	Crampton.
McDonald, Geo.	Bluevale.	O'Flynn, J. J	Kinkora.
McEwan, F. S	Verschoyle.	O'Flynn, T	Kinkora.
McIllwrath, Jas. H.	Bookton.	O'Grady, G. dec.	Woodstock.
McIntyre, Alex., jr.	Ingersoll.	O'Meara, Thos	Ingersoll.
McKay, A	Brooksdale.	Ormerod, Wm.	Napier.
McKay, D. & A	Woodstock.	Pace, Calvin	Vienna.
McKee, E. A	Molesworth.	Paget, J. N.	Canboro'.
McKellar, D. N.	Blythe.	Parr, Frank	Hampton.
McKenzie, Alex.	Donegal.	Parker, A. A	Rockford.
McKenzie, Donald T	Lochalsh.	Parker, Fred	Braemar.
McKenzie, Geo. M	Ingersoll.	Parker, R.	Atwood.
McKie, Geo	Norwich.	Pate, James	Brantford.
McLaren, Jno. C.	Stratford.	Patterson, Frank	Thamesford.
McLaren, Wm	Avening.	Pearce, Jno. S.	London.
McLean, N.	Listowel.	Pearson, Isaac	Fairground.
McMaster, Ferguson	St. Marys.	Pearson, Sidney	Cassels.
McMillan, D.	Poole.	Penhale, R. A.	St. Thomas.
McMunn, H. J.	Wallace.	Peters, Oliver	Brunner.
McMurray, R. B	Gladstone.	Pettit, Chas.	Nixon.
McNally, Thos	Otterville.	Pettypiece, Wm	Motherwell.
McPherson, Jno	Fingal.	Phelps, F. H	Eden.
McMylor, Thos.	Vesta.	Phelps, L. L	Dereham Centre.
MacLaren, A. F	Stratford.	Platt, Jno.	Salop, Eng.
MacLaren, Jas. B	Ingersoll.	Poole, James	Waba.
Maid, A. F	Winnipeg, Man.	Prain, Jno	Harriston.
Main, S	Sheffield.	Price, L. A	Mt. Elgin.
Mallory, T. C	Yarmouth Centre.	Proudfoot, Johnston	Avonbank.

LIST OF MEMBERS.—*Concluded.*

Name.	Address.	Name.	Address.
Prouse, Thos	Dereham Centre.	Stevens, H. B	Lambeth.
Pyke, H. R	Shakespeare.	Stevenson, H	Ingersoll.
Ralph, George	Glanworth.	Stevenson, S. K	Camlachie.
Raymond, Geo	Ingersoll.	Stewart, Wm	Hickson.
Revell, C	Regina, N.W.T.	Stone, E. J	Amherstburg.
Riach, F. C	Newry.	Stone, Geo	Courtland.
Rice, A	Curries'.	Stratton, R. W	Guelph, O. A. C.
Rice, F. A	Curries'.	Sutherland, Jas	Montreal, Que.
Richardson & Webster	St. Marys.	Swartz, W. J	Aylmer.
Richardson, David	Vandecar.	Swayze, Edward	Dunnville.
Riddell, A. D	Shakespeare.	Symington, J. W	Camlachie.
Riesberry, Jno	Bright.	Tackaberry, N	London.
Riley, C. W	Ingersoll.	Talbot, J. L	Lucan.
Rinch, E	Curries'.	Taylor, Henry	Simcoe.
Robertson, Geo. S	Lucknow.	Tehen, J. Theo	Otterville.
Robertson, Robt	Box 396, London.	Thomas, J. H	Ingersoll.
Robitaille, Joseph	Lafontaine.	Thompson, Frank A	Woodstock.
Robson, Wm	Campbell's Cross.	Thompson, James	Bothwell.
Rollings, Walter	Walsh.	Thompson, J. S	Belfast.
Rushing, Jno. W	Boston.	Thompson, R	Eastwood.
Rounds, A. D	Harrington.	Thompson, W. B	Brooksdale.
Sanderson, R. S	Sparta.	Tillson, E. D	Tilsonburg.
Schell, M. S	Woodstock.	Todd, J. E	Salford.
Schneider, L	Carthage.	Toppin, P	Mossley.
Schrumm, Alf	Bismarck.	Travis, C. C	Acacia.
Schuyler, W. H	Simcoe.	Treadgold, Geo	Lake Oak.
Scott, Jno. H	Cromarty.	Treffrey, C. E	Hawtrey.
Scott, Jno	Innerkip.	Treffrey, W. J	Hawtrey.
Sellars, T. B	Laurel.	Tremain, John	Forest.
Shantz, Emanuel	Wallace.	Tucks, Henry	Kelvin.
Shearer, W. C	Bright.	Tyndall, W. A	Monkton.
Shearer, W. R	Villa Nova.	Vance, Joseph	New Hamburg.
Sheardon, W	Verschoyle.	Vankleek, J	Listowel.
Shepherd, E	Jaffa.	Waddell, Wm	Komoka.
Sheppard, John	Bothwell.	Walker, Ed	Oakdale.
Shuttleworth, J. M	Bow Park, Brantford.	Walker, Geo A	Box 50, Dresden.
Sidmore, I. W	Mt. Elgin.	Wallace, Samuel T	Pownall, P. E. I.
Simister, R. A	Ingersoll.	Wardell, Thos	Woodstock.
Sinclair, James	Teeswater.	Waring, J. E	Newark.
Slaght, J. H	Glen Meyer.	Whaley, W. J	Dereham Centre.
Smith, Edward P	Sardis, B.C.	White, Harry	Hawkesville.
Smith, C. W	Centralia.	Whitelaw, Robt	Woodstock.
Smith, H. C	Grand View.	Whiting, Joel	North Ridge.
Smith, O. T	Binbrook.	Wilford, John	Brownsville.
Smith, R. S	Beachville.	Wilkinson, J. H	Verschoyle.
Smith, Reuben	Mt. Elgin.	Wieland, A. C	Montreal, Que.
Smith, S. A	Dorchester.	Williams, J. F	Ingersoll.
Smith, W. S	Stratford.	Williams, J. H	Paris Station.
Smuck, C. G	Tupperville.	Willoughby, W. G	Walnut.
Snell, Robt	Norwich.	Wills, Henry	Winger.
Southwick, H. A	Avonton.	Wilson, Hugh E	Arkona.
Spavin, Wm. W	Hagersville.	Wilson, C. C. L	Ingersoll.
Spicer, J	Harwich.	Winders, W. K	Springfield.
Stacey, Thos	Fullarton.	Wood, Geo	St. Marys.
Stacey, W. P	Summerhill.	Wordell, Jno	Springford.
Steinhoff, I. W	Stratford.	Wyles, W. J.	Woodstock.
Sterrett, W	Motherwell	Young, James	Thamesford.
Stevely, Samuel	London.	Young, T. E	Strathroy.

ONTARIO CREAMERIES' ASSOCIATION.

Name.	P. O. Address.	Name.	P. O. Address.
Abott, Chas	Exeter.	Kinsey, S. V	Bolton.
Allen, A. W	Toronto.	Levette, W. H	Exeter.
Baker. Frank	Aultsville.		
Balkwell, Geo	Port Elgin.	McCormick, Jas	Cornwall.
Barrie, S. M	Winnipeg, Man.	McCrimmon, D. W	Glen Roy.
Beckstead, Jos	Martintown.	McDougall, D. H	Martintown.
Bergan, John	Cornwall.	McEwing, Michael	Cornwall.
Bobier, A. Q	Exeter.	McGillis, A.D	Montreal, Que.
Boonson, G	Cornwall.	McHoover, J	Goldfield.
Brown, S	Crediton.	McIntosh, J. I	Toronto.
Brown, S. P	Brantford.	McLean, D. H	South Finch.
Brubacher, M	St. Jacobs.	McLennan, D. J	Lancaster.
Binion, W. C	Iroquois.	McLennan, D. N	Summerstown.
Bush, Elias H	Lunenburg.	McMillan, A. L	Newington.
Byers, G. H	Hawkesbury.	McPherson, Alex	Tay Side.
		McTavish, John	Seaforth.
Caloren, Geo	Iroquois.		
Campbell, A	Ormond.	Marjerrison, W. R	Apple Hill.
Carmichael, Jas	Arva.	Meen, Fred. W	Greenwood.
Carter, J. G	Nassagaweya.	Millar, Thos. J	Spencerville.
Clark, Geo. E	Martintown.	Muir, J. B	Avonbank.
Conroy, W. J	Summerstown.	Munroe, Chas	Ventnor.
Craig, J. A	Renfrew.	Munroe, D	Cornwall.
Croil, John H	Aultsville.	Murphy, R. G	Elgin.
Cunningham, A	Cornwall.		
		Pearce, John S	London.
Denike, S. W	Sine.	Pelow, Jos	Summerstown.
Derbyshire, D	Brockville.	Perrigo, G. W. & Co	Georgetown.
Devitt, W. J	Greenwood.		
Dillon, T. J	Charlottet'n, P.E.I.	Randall, David	Ayton.
Dorion, F. A	Montreal, Que.	Reiner, J. G	Wellesley.
		Richardson & Webster	St. Marys.
Elliott, J. H	Chesley.	Robinson, W. T	Maple.
		Rorke, H. J	Meaford.
Froom, F	Mille Roches.	Rutherford, W. D	Iroquois.
Gardner, James	Cornwall.	Snider, Mr	St. Jacobs.
Gardner, Archibald	Cornwall.	Smith, J. A	Martintown.
Gillespie, Ed	Cross Hill.	Spackman, E. J	Exeter.
Graham, R. J	Belleville.	Spear, M. L	Lisbon Centre, N.Y.
Green, F. L	Greenwood.	Sprague, Mark	Ameliasburg.
Gerow, F. W	Napanee.	Sprague, John	Ameliasburg.
Gerow, Frank	Napanee.	Sutherland, James	Montreal, Que.
		St. Thomas, Peter	Cornwall.
Halliday, W. A	Chesley.		
Hayes, John	Cashions Glen.	Tobin, T. M	Cornwall Centre.
Hayes, H. J	Glenroy.		
Hayes, Fred	Montreal, Que.	Vandervoort & White	Sidney Crossing.
Henrick, H. A	Headford.		
Hodge, Wm	Cornwall.	Walton, W. G	Hamilton.
Hodgins, A. S	Osnabruck Centre.	Wenger, A	Ayton.
Hodgson, H. A	Montreal, Que.	West, W. O	Avonmore.
Hutchison, C	Ottawa.	Wilson, Andrew	Montreal, Que.
		Wilson, Frank	Montreal, Que.
Irvine, Wm	Martintown.	Wilson, J. Lockie	Alexandria.
		Wood, W. D	Cornwall.
Jackson, Jas	Roebuck.	Wright, A. A	Renfrew.
Johnson, Geo	Yonge's Mills.	Wright, Geo. R	Cornwall.
Johnson, Chas	Athens.		
Jones, Geo. T	Cornwall.	Yellow, Thos	Exeter.
Kinnear, Henry	Grant's Corners.	Zinkann, J. N	Wellesley.

FINANCIAL STATEMENTS FOR 1895.

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

RECEIPTS.

Cash balance from 1894	335 10
Members' fees	213 25
Legislative grant	2,750 00
Proceeds from advertisements in programme for 1895	215 50
Part proceeds from advertisements in programme for 1896	10 50
Fines received 1895, per T. B. Millar	117 82
Inspectors' fees, 1894, received from factories	45 00
Inspectors' fees, 1895, received from factories	230 00
Expenses received *re* prosecution in 1894	11 60
City of Stratford grant, less banquet expenses	66 75
Secretary's travelling expenses for 1895, received from factorymen and others	34 00
Travelling expenses, 1894, received	12 25
Proceeds from sale of three Babcock Testers	23 35
Proceeds from note discounted March 11th	296 30
Proceeds from sale of cheese used at Stratford convention	2 00
Refund G. T. R. two tickets, Wingham to Kincardine	1 70
Total	$4,365 12

DISBURSEMENTS.

Convention expenses:		
Speakers, services and expenses	$155 00	
Printing programmes and wrappers	144 50	
Printing badges and for ribbon	22 83	
Printing invitations, dodgers, etc	26 30	
Reporting	80 00	
Advertising	83 00	
Sundries	8 75	
Local conventions expenses		$520 38
Directors' expenses		154 71
Office expenses and auditing		96 05
Printing prospectus and letter-heads		203 13
Secretary's travelling expenses for 1895		14 00
Inspector's travelling expenses for 1895 (part)		177 40
J. W. Wheaton, balance of salary for 1894		238 43
T. B. Millar, balance of salary for 1894		206 50
T. B. Millar, salary in full for 1895		31 76
J. W. Wheaton, salary in full for 1895		800 00
Expenses, delegates to Good Roads convention		1,000 00
A. Pattullo, allowance for postage, etc., 1894		21 85
Easy chairs presented to T. B. Millar		10 00
Mimeograph for secretary's office		25 25
Released note discounted March 11th		15 00
Cheese for object lesson at Stratford convention		300 00
John Podmore, expenses to Ottawa, 1885, *re* Dairy Legislation		6 30
Grant to Western Fair		26 00
Grant to Industrial Fair		100 00
Grant to Dairy Department Provincial Fat Stock Show		50 00
Supplies for inspector		50 00
Expenses *re* prosecution, 1895		2 80
H. White, expenses of visit to Aurora Factory		16 00
Balance on hand		6 50
Total		293 06
		$4,365 12

ASSETS.

Balance on hand	293 06
Inspectors' fees, 1895, unpaid	35 00
Inspectors' fees, 1894, unpaid	15 00
Office fixtures	40 00
Total	$383 06

We hereby certify that we have examined the books and vouchers of the Dairymen's Association of Western Ontario for 1895, and find them correct and in accordance with the foregoing statement.

January 3, 1895

J. A. NELLES,
J. C. HEGLER, } Auditors.

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

Receipts.

To balance on hand from last audit	$379 21
Membership fees	137 00
Legislative grant	2,750 00
Amount received from fines	474 00
Amount received from Napanee Board	200 00
Amount received from Kingston Board	200 00
Amount received from factory fees	1,444 10
Total	$5,584 31

Disbursements.

Grants to Fairs:	
Toronto Industrial Exhibition	$50 00
Gananoque Dairy Show	50 00
Expenses of conventions and regular meeting	446 50
Officers' salaries	170 00
Grant to Dairy School, Kingston	50 00
Directors' meetings, Toronto, Ottawa and Kingston	284 82
Postage and Stationery	6 00
Account of Western Committee	25 50
Inspectors' salaries and expenses:	
W. W. Grant	730 00
G. W. Bensley	725 00
G. Publow	900 00
J. D. McCann	486 00
A. P. Purvis	786 00
Reporting	75 25
Printing, $10.00; Acid, $14.00	24 00
Balance on hand	775 24
Total	$5,584 31

We hereby certify that we have examined the books and vouchers of the treasurer of the Eastern Ontario Dairymen's Association and find them correct and in accordance with the foregoing statements.

(Signed) Morden Bird, F. W. Brenton, } Auditors.

CREAMERIES' ASSOCIATION OF ONTARIO.

Receipts.

Balance from last audit	$168 33
Members' fees	64 00
Donations	3 00
Legislative grant	2,000 00
Advertising in programme	130 00
Total	$2,365 33

Disburstments.

Grants to exhibitions at Toronto and Ottawa	$300 00
Expenses for taking charge of butter at exhibitions	62 25
Officers' salaries	129 00
Directors' fees and expenses	281 36
Postage and stationary	10 00
Printing	130 00
Advertising	16 50
Lecturers' expenses	75 00
Inspector's salary	750 00
Inspector's expenses	341 75
Cost of reporting	80 00
Commercial ticket for instructor	10 00
Balance on hand	179 47
Total	$2,365 33

Examined and found correct.

R. G. Murphy, A. F. Mulhern, } Auditors.